

NEW ISAAC ASIMOV ARTICLE

FUTURE SCIENCE FICTION

AUG. 1959

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THE FIRST THREE
DIED!
WAS THERE HOPE
FOR A

NEW MODEL SPACEMAN

by **Theodore
L. Thomas**

PLUS

SAFETY VALVE

by **Brian W.
Aldiss**



You Are There -- ON THE MOON!

IN **ISAAC ASIMOV's** REVEALING ARTICLE

POINT OF VIEW: THE MOON



SKINNY

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FUTURE SCIENCE FICTION

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● NEW ASIMOV ARTICLE

- POINT OF VIEW: THE MOON** *Isaac Asimov* 28
It won't be long now before a man is on the Moon. What will he see in the sky when he's there? How do astronomical findings compare with descriptions in science fiction? Read this article, and you'll find that **you are there!**

● NOVELET

- NEW MODEL SPACEMAN** *Theodore L. Thomas* 46
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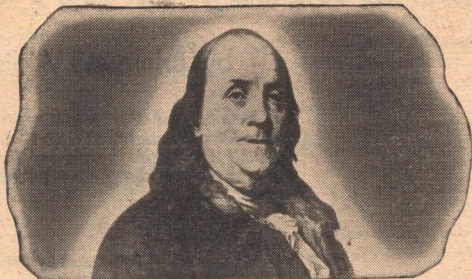
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Safety Valve

by Brian W. Aldiss

The members of this secret project had to have an emotional outlet—and Dashiell Whiteley's particular kind of success made him the perfect subject for him.

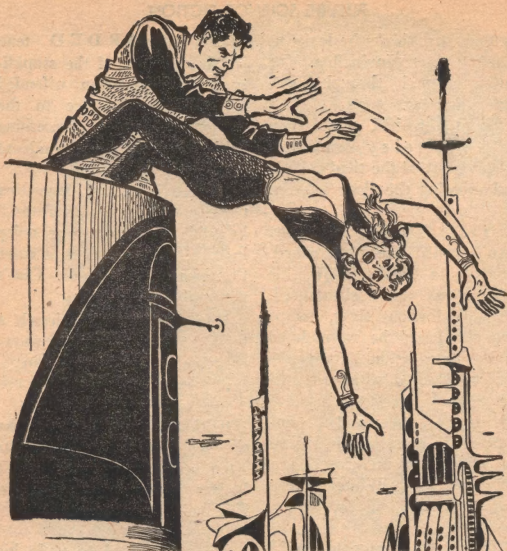
illustrated by EMSH

DASHIELL WHITELEY shut the door of his Baltimore flat behind him, leant on it and sighed. From the flat above came a sound of stamping and castanets and cries of "Ole"; the van Hoosens were still trying to capture a mystical something they had found on their summer vacation in San Domingo.

Whiteley sighed again and headed for the shower. He needed a freshener. Since qualifying two years ago, at the

age of forty, for an executive post in Civil Service, Whiteley had done almost no manual work. In fact, his hardest job had been signing the interminable parade of forms. Changing offices today from one floor to another, he had given a hand carrying furniture and books; the unaccustomed effort had tired him.

"Old age a-creeping on!" he told himself, stripped off his singlet, and walked into the shower. Under the warm deluge he relaxed, broke into a



Just a shove, and Whiteley was rid of the girl. He was sure no one would suspect him.

discordant whistle that got fouled up every so often in a jet of water.

He shut off the attempt at a tune abruptly when he noticed a bearded man staring at him round the bathroom door. The

man's presence was unexpected enough, but something in his gaze was particularly unnerving. He was looking at Whiteley not so much the way a snake looks at a rabbit as the way a rabbit, in a wish-fulfil-

ment dream, thinks he looks at a snake. Cold. Invincible. The worm, turned through one-eighty degrees.

"Who the hell might you be?" Whiteley demanded, jumping out of the tiled cubicle and crossing the floor angrily.

"You're Dashiell Whiteley, aren't you?" the man asked. He was a small fellow, his voice weak but self-assured. He looked about sixty, except that the beard he wore down to his first jacket button was barely streaked with gray. In compensation for that, his face was gray all over; and that included his eyes, which looked no pleasanter up close than they had when Whiteley first saw them.

"What's my name to you?" Whiteley asked nastily. He was still trying to forget how this cream cheese countenance had jarred his nerves. "If you're looking for the nearest bus stop, it's down the other end of the corridor."

"You don't mind if I come in, do you?"

"Hell, don't bother to ask me! You are in, aren't you?"

THE BEARDED man shrugged, as if the stupidity of the question offended him. His indifference to the conventions was something Whiteley might have pondered over in a cooler mood.

"There is such a disgusting noise coming from overhead," he said. "And you were noisy in here, too—so I had to enter to make myself heard. That's reasonable, surely?"

Whiteley snatched himself a towel and turned off the shower. "Look, pop," he said angrily, "you're a bit low on etiquette, aren't you?"

"Etiquette!" Bearded spoke the word as if savouring its Freudian connotations. "Don't bother me with inessentials. I've had time to think..."

He commenced to undo his top coat and take it off. What he might be doing in a top coat on a warm summer evening was no business of Whiteley's, but he did not like to see the little man so complacently making himself at home. Dropping his towel, Whiteley grabbed the two coat lapels and wrapped the coat tightly and savagely back on, after-

wards belting it securely round the man's bony body.

"Now," he breathed, "you either about turn, quick march through that door, or you tell me something that catches my fancy, and pronto."

"Your shower's still running," the little man said quietly.

Whiteley released him and turned slowly round. The shower indicator was hard over 'Hot', scalding water fell in a steamy column. He knew he had switched it off—anyhow he had had it running only at Tepid. But—nobody else was in here, he'd had hold of the little man: ergo, Whiteley had not switched the shower off when he supposed he had. You have to kill creepy notions with logic, man! Whiteley switched the shower off now.

When he turned round the visitor had got his coat off. The little fellow had gone into the living room and coolly switched on the bar fire—and now the bearded man was warming his hands!

IRRITATED again, Whiteley began hurriedly to dress,

pulling his clothes over damp limbs. This old boy had qualified for the bum's rush. He was switching the desk light on, now. But as Whiteley dressed; the old boy began to talk. His voice seemed to float clearly through the *ole-ing* from above.

"I can tell you're Dashiell Whiteley now," he said. "You've got that same overbearing manner. No, I feel no surprise that you don't recall me; yet we roomed next door to each other one semester at Balt Tech. You were always the extrovert, I was the introvert... Nothing changes a man in that sort of respect."

"Sorry, I don't remember you, buster," Whiteley said, struggling into slacks. What was this anyway, a touch? Besides, the bearded man was at least fifteen years Whiteley's senior; they could never have been together at Tech.

"My name's Herbert Farthingdale," the intruder said. "We used to play the rhine-cards together."

The rhine-cards! That at least was distantly familiar, like a well-known picture seen from a long way off. The Tech

days were, after all, nearly two dozen years ago. Whiteley had made the cards himself; he had rigged up a table in his room with a shield bisecting it in approved fashion. It had been a craze with the guys at one time to come and try to guess which card Dash Whiteley was flipping up: a craze soon finished and forgotten.

And one of the boys, Whiteley began to remember, consistently did better than average. Not much better, just enough to show. A long-faced guy with an odd name...Farthingdale. Herb Farthingdale.

TUGGING on a sweater, Whiteley went and stared into the other's face. That was no fun; the strangeness of the eyes loomed large. Something in the facial shape did seem familiar.

"So you're Herb Farthingdale's father, huh?" Whiteley said, as one might say "So what?"

"I'm Herb Farthingdale himself," the other said. "There's a car outside waiting for us; I want to take you somewhere and show you something."

But Whiteley was still catching up. "You're Herb Farthingdale? Man, you've aged! Where've you been? Been sick? Doing a stretch? Late nights?"

"You might say twenty years of late nights. I've been engaged in an experiment; it has aged me in some ways, as you observe, but the experience has been worth the sacrifice of what otherwise would be wasted years. I want you to come and see some of the fruits of the experiment."

A decision was needed. Either Whiteley stuck to his original plan and threw the intruder out, or he scrapped it and went out with him. Tempting as the first alternative still was, it was the second Whiteley chose, without really knowing why. Something in Farthingdale's face urged him to play along: it was that look as if the man had broken through some sort of barrier and become a member of another species.

"What makes you so keen to show me?" he asked. "We were never what you'd call friends. As you say, we were different types."

THAT LOOK of Farthingdale's suddenly blazed with a wild hunger; if eyes ever turned nova, those did. As though aware of his reaction, Farthingdale looked away.

"I feel I owe you a lot, Whiteley," he said. "You accidentally set me on the trail I've followed ever since." His bloodless hands arched together on his lap, remaining locked and trembling.

Nothing in his aspect suggested that the trail had been pleasant, or that he was particularly grateful for it; he looked more like a man out for revenge. Farthingdale was lying—there was a mystery. A tiny pulse of excitement began to beat in Whiteley. He knew suddenly why he was going with this bearded specter: that prospect felt less monotonous than the prospect of an evening in his flat alone.

Muttering a vague excuse about going to comb his hair, Whiteley slipped into the bedroom and rifled through his sock drawer. With a pleasing sense of melodrama, he pulled out his small automatic, loaded it, and slipped it with some spare slugs into his trouser

pocket. He walked casually back into the other room. Farthingdale was putting his coat on again, methodically switching off the heater.

"Where are we going?" Whiteley asked.

"Little Thistle."

Whiteley whistled. "You out there, Farthingdale? What exactly is your line of research?"

"Let's say I'm working for the government."

LITTLE THISTLE lay some ten or twelve miles south west of Baltimore, across the Patapsco River. It was a big atomic research station built two and a half decades ago, in the early sixties; whatever went on in that acres-wide straggle of buildings, it was plenty private to judge by the security precautions surrounding the place.

"How did you happen on me after all these years?" Whiteley asked as they dropped in the lift down to ground level.

"Our organization can trace anyone."

"Is that so? This better be good. Farthingdale; you're giving yourself a big build-up."

"You talk too much, Whiteley. As ever."

This, thought Whiteley, is not the sort of conversation I have with anyone. Not since I was out of knee-pants. "Come and have a drink and snap out of it, Farthingdale," he said with all the patience he could muster, as they emerged into the foyer.

"I don't drink. Besides, the sedan's waiting."

Not only the sedan, but a uniformed driver, who turned a hard, searching face on them as they climbed into the rear seat. It suggested a jolly, social evening, Whiteley thought. A reunion of good old school pals and all that. "You used to drive," he said, tugging his door shut.

"Not since—not for twenty years," Farthingdale replied. "I've forgotten how." As soon as they started moving through the lighted city, his reserve faded. He seemed suddenly animated, almost intoxicated, jerking his head first to stare through one window then the other. It was as if the sight were entirely new to him. A flashing neon sign almost sent him into ecstasies.

"How an ad man would love to see you now," Whiteley observed. This vivacity riled him as much as the earlier taciturnity. "Where've you been hiding all these years, Farthingdale—up on the moon?"

"We've been further than that—in another direction," Farthingdale said uninterestedly.

THERE FLEW another hidden meaning. It was one too many for Whiteley. He pressed the young-old man for an explanation. Now that they were clear of the suburbs, and licking through Catonsville, Farthingdale acted as if his seat were more comfortable. He allowed his companion another iceman-cometh look.

"What powers industry, Whiteley? And trade? And war? And human enterprise generally?"

Dumbly, Whiteley stared at him. "Listen friend," he said slowly. "If you turn out to be some sort of quiz-master, and it turns out I'm on some sort of crummy video show—I'm going to break your neck!"

"The way you broke Ollie Grant's?"

Whiteley stiffened. "That was an accident, and you know it. We weren't fighting, we weren't even mad. Everyone agreed that it was an accident."

Farthingdale croaked with irritation. "You asked me for an explanation, and if you want one you had better answer my question. What is it that powers civilization in general?"

"This I suppose I asked for... Lord Almighty, man—atomic power, I presume."

"Wrong. Typical engineer's answer. Look, think of the billions of dollars and floods of ingenuity spent on all branches of the auto industry. Not a tenth of it need be spent to maintain essential travel; the rest goes on frills—fashion, gadgets, or the playboy traffic. Or take the confectionary trade; not a tenth of that satisfies hunger—it's all frills: candies, chocolates, gum, mere jaw activators. Or take the jewelry trade: it has no core of necessity; it's entirely frills. And the same sort of thing can

be said of every branch of commerce."

"Sure, sure," Whiteley agreed. "These frills as you call them are a yardstick to the richness of our civilization."

"**I**N A WAY you do not realize," Farthingdale said sternly. "I am going to tell you that these frills are as necessary to the heart of man as the supposed necessities themselves. They are products of the basic thrust in human nature. Now take the supposed necessities themselves: transport, communication, power. Take more, Whiteley—take any human activity. Love-making, war, litigation... What creates them, what's the basic thrust behind them?"

In the darkness, Whiteley shrugged his shoulders.

"Love of power, I guess," he replied, indifferently. "Sex, maybe. If you've spent twenty years mugging up Freud, I'd say you wasted your time, Farthingdale."

"Not love of power. Not sex," the other snapped, ignoring Whiteley's jibe. "I'll tell

you the basic thrust: boredom!"

As he spoke, the sedan swung left up a short road and stopped in front of a floodlit barrier. Concrete blockhouses stood to each side of the barrier and a double wire gate some distance behind. An armed guard approached them.

"Sorry to spoil your punch line, brother, but here's Little Thistle," Whiteley announced. "Now maybe you'll tell me what you think will induce them to let me into their holy of holies."

"This," Farthingdale said, unperturbed. He produced a document from an inside pocket and unfolded it. It was headed by three photographs of Whiteley, full face, half-profile and profile. For the first time, Whiteley realized in astonishment that this episode was not some weird *jeu d'esprit* on Farthingdale's part; an organization was interested in him, and Whiteley was not fond of organizations.

"Will you three get out and stand in the road," the guard said, sticking his face close to a window. They complied, and the guard looked them over

cursorily in the glare of a floodlight, glancing afterwards into the sedan to see nothing or nobody was hiding there.

THE BARRIER was lifted, they moved to the wire-gates. More inspections, this time more thoroughly by a captain, a phone call to somewhere unspecified, and the double gates swung open for them. Ground lights flicked into being along a straight, tarmac drive. They climbed back into their seats and rolled on.

"Boredom," Farthingdale said, satisfaction in his feeble voice. "All of this created by boredom."

Whiteley had seen Little Thistle from the highway a score of times. It was little more impressive from close to—far less, in fact, than its fictional counterparts, with which he was familiar on TV and film. The buildings, most of them low and dispersed, were mainly lost in darkness now.

They drew up outside a concrete block where several lights burned, and went in, to find themselves in a waiting room. It looked to Whiteley as if there was no entrance to the

interior of the building except through this room, where locked turnstiles guarded a corridor at the rear. Farthingdale led the way over to a counter behind which a nonentity in uniform nodded to them through a thick steel grille.

"Friendly place this," Whiteley observed. "Alcatraz without the home comforts."

An intercom buzzed at the nonentity's elbow. He flicked a switch, listened to a distant crackle of speech, said laconically, "Yeah, just arrived... Yeah, that's them... Yeah," and stood up.

"I'll get the key man," he said to Farthingdale, and pressed a button. In a moment, a door behind the counter opened and a uniformed guard appeared; after conferring with the nonentity, he disappeared again, to reappear a few seconds later with a single key as big as Whiteley's automatic.

THE NONENTITY freed the turnstiles by an unseen lever, and they followed the guard down the corridor, their footfalls silent on rubber tiling.

"What have you in this joint anyway?" Whiteley asked, im-

pressed despite himself. "Dirty postcards?"

"No, bud," the guard answered unexpectedly. "Your freedom."

He stopped them at a massive door that would have suited a bank strong-room. It bore the superfluous sign: *Keep Out*. The guard inserted his key and three small lids snapped open on the door; these revealed combination locks, which the guard whirled efficiently. As the last number clicked into place, the door hinged inwards under its own power. Farthingdale stepped importantly through. Whiteley paused to look at the guard as if he expected that dignitary to bow at the end of his performance.

"Thanks, tovarich," Whiteley said, and stepped after Farthingdale. The big door swung shut behind them.

Farthingdale turned and gripped Whiteley's arms. His expression was one of almost insane eagerness. Whiteley turned uneasily away. "Feel my big strong muscles some other time," he said. "Right now, I want to know what goes on. What is this place to you?"

"I am—they call me the manager."

"You live in a joint like this, Farthingdale?"

"Of course, of course! Down these stairs, please."

THE LOWER they went, the warmer it grew. At the bottom of the staircase, a carpeted circular hall served a dozen doors, all closed. The walls were bare, the doors unpainted, the lighting not as good as poor. Total effect: depressing in the extreme. A faint explanation of Farthingdale's anti-social behavior began to glimmer.

"Welcome to Project Tedium," Farthingdale said, leading through one of the doors into a small, bare office which boasted little more than a desk and a hatch in one wall. He began to remove his coat. "This is the manager's office, by the way," he added.

"Just what is all this about boredom and tedium?" Whiteley said, sorry he had missed that drink at the flats, "And how do they tie in with this atomic plant?"

"Smart question," Farthingdale said. "Answer: they don't

tie in at all. This project down here has nothing whatsoever to do with Little Thistle. It's just an arrangement of convenience. Look at it this way: you have two hush-hush projects, like ours and Little Thistle. Right? No matter that ours is a small set-up, it still needs to be guarded with as much care as the atomics. Well then—put them behind the same protected perimeter: one lot of security precautions covers them both. Neat, eh? Saves the government quite a few dollars in a year!"

"A nice thought," Whiteley admitted.

"And of course Little Thistle serves as an ideal cover for us—for Project Tedium," Farthingdale added.

"Sure, sure. You were going to tell me about that. Remember?"

"I tried to, Whiteley, but you failed to listen attentively. Perhaps you'd better have a practical demonstration of what we do here."

AGAIN THAT look returned to his face. He picked up a microphone lying on a table, pressed its switch

and said ominously into it, "Farthingdale here. I've got him, boys; I'll bring him round."

I want out, Whiteley thought. This place has the bright and cheery feeling of an old graveyard. Whatever they do down here, I want no part of it—and I don't want them wanting a part of me. However, that's a thought I might have thought before the philosophical character shut the safe door on us. Right now, I'd be more usefully employed humoring mine host; it might be a useful idea to find out just what he is mixed up in.

So he stood up, making sure Farthingdale saw the head and shoulder difference between their respective heights. "Let's go see the boys," he beamed.

Without exactly managing to beam back, Farthingdale did produce a sort of sly all-the-better-to-eat-you-with grin as he led the way back into the circular hall.

"Behind each of these other doors," he said, "lie short corridors with twelve rooms branching off each of them. We've a gymnasium down here and a small swimming pool and

a medical bay; otherwise the rooms are all private—one man per room."

"Don't you eat?"

"I'll show you that arrangement later. We are entirely self-contained here, Whiteley."

"You do seem kind of cut off," Whiteley muttered.

"We are entirely cut off," Farthingdale said. "The big door upstairs is invariably kept locked, except on special occasions. We cannot get out of here even if we wanted to."

"You mean — you are trapped here?"

"I've just explained so, haven't I? Now then, we'll go in through this door—and try to keep quiet, Whiteley, will you?"

"Can I help it if my corsets creak?"

"Your voice, man."

JUTTING his ragged beard, Farthingdale pushed open one of the doors and they entered a passage with twelve doors leading off it, as he had described. He paused before one of them and listened at it. Silence was so absolute that Whiteley could hear a faint, constant humming—an air cir-

culator, maybe—and below that, fainter still, an unplaceable rustling sound. It reminded him of a black panther he had once seen at a zoo; its continual pacing almost noiseless. As Farthingdale opened the door, Whiteley instinctively stepped back.

When he tagged on, however, there was nothing very frightening in the room, which was really little more than a cubicle. A young man wearing something like a track suit stood rooted to the center of the room with his eyes wide open at them. Quite a good-looking young man, Whiteley thought, although his stare was highly disconcerting.

"Get back on your bunk, Richards," Farthingdale said to him gently.

The young man climbed back onto a spongy mattress without deflecting his stare from Whiteley. The latter pulled a pig's face back. Meanwhile, Farthingdale began to point out the furnishings of the room, which were sparse.

"There's a loudspeaker," he said, pointing above the bed. "I can speak to him from my office over that, if I wish. Be-

yond that door is his private toilet. Down into this hatch comes his food: two meals per day, carefully balanced diet."

HE SWUNG the twin doors open to let Whiteley see the space beyond, adding, "All meals are prepared in quite a separate section above here, into which we have no access, and descended to this level by lift. Thus none of our time is wasted on cooking."

And at a pinch, a fellow might be able to get out that way, Whiteley thought. He had noticed a similar hatch in Farthingdale's room. He turned to the only other objects in the cubicle—four balls the size of baseballs which lay on a wide ledge above the higher end of an incline. The incline was gradual and stretched from one side of the cubicle to the other, at the foot of and on a level with the man on Richards' bed.

"What may these be?" Whiteley asked, indicating the balls.

"Show him, Richards," Farthingdale said, and tensed himself eagerly.

Richards switched his gaze

away from Whiteley with obvious reluctance, fixing it instead on the balls. He looked like a man about to have a fit, his body rigid, his mouth pursed. For a long while, nothing moved in the little room. Whiteley started to open his mouth; and then one of the balls began to stir. The lightest ball—it looked as if it was made of papier mache—rolled about an inch, stopped, rolled again, teetered on the edge of the slope and then sped down it, coming to a stop against the wall at the bottom. Then it began to climb back up the slope, slowly painfully, half way up, three quarters—then back to the bottom, as though suddenly exhausted.

Richards groaned and wiped his forehead. "I got it back up again once yesterday without any misfires," he gasped. He seemed to be apologizing.

Whiteley grabbed the ball off the incline. It was light as a feather. "How...?" he said blankly.

"B o r e d o m," Farthingdale said in triumph. "Well done, Richards, thank you. We'll leave you now."

HE LED THE mystified Whiteley back into the corridor, closing the door behind him.

"And that lad's only been with us seven months," he said. "It's a remarkably early start; he shows great promise. They sometimes take up to a year merely to adjust to the new conditions. All the men in the twelve rooms on this corridor are recent intake. Clayson, the one with longest service, has been here about eighteen months; he can move all four balls at once now, including the heaviest, the lead one."

The missionary gleam burnt in his eyes again.

"Move them, move the balls," Whiteley stumbled. "You mean, they move them just by staring at them, by mind power?"

"Certainly. Why do you sound so surprised? It's psychokinesis. The idea has long been familiar to intelligent people. Indeed, it has been practised before—magic carpets, for instance, operated on the psychokinetic principle. But never before now has a consistent, scientific way of training psychokineticists been

evolved. That, in a nutshell, is the function of Operation Tedium."

WHITELEY shook his head dumbly, following Farthingdale into the deserted circular hall again. "Do I take it," he said, "that you're trying to tell me you've got about a hundred and forty people with strange mental powers trapped down in this vault wasting their lives away?"

"Whiteley—I warn you we take a rather different view on the value of individual human existence from any view you're likely to have. And the government allows us considerable latitude in a practical way on that point."

Do I challenge what he means by that or don't I? Whiteley wondered uneasily, disliking the peculiar stress Farthingdale laid on the words. He decided he would rather let it slide; if anything, the other's manner was becoming more excitable.

"Er—look, Farthingdale, how long do these people with strange powers have to stay down here?" he inquired, with

a vision of himself locked into one of the cubicles.

"They have no strange powers when they arrive," Farthingdale said. "They are ordinary people, and they volunteer for five years of almost complete isolation. At the end of that time, they could be free if they wished. In fact—nobody goes; they stay on, as I stay on. As I told you, I've been here twenty years."

"Why?" Whiteley asked. "How could you stand twenty-four hours of it?"

"It's subterranean here," Farthingdale explained, "sheltered, safe, warm. It's a womb, Whiteley, a psychological trap. You can't leave once the feeling of it has penetrated into your soul. We've got our own way of life here, tucked away from the aggressions and irrelevancies of ordinary existence."

The different species, Whiteley thought again. *Twenty years down here!* No wonder Farthingdale looked and acted the way he did. The wonder was he was no madder; but the depth of his madness had yet to be plumbed.

"Come back into my office,

Whiteley," Farthingdale said. "You need just a little while to take it all in."

WHITELEY followed meekly behind, asking hopelessly for a drink.

"Only water here," was the reply. Farthingdale sat on the desk, rubbed his hands, swung his legs, blinked his eyes. "You shall meet all the fellows soon, Whiteley. You'll like them—and I'm sure they'll like you. Doesn't Project Tedium fascinate you? It's epoch-making to you, isn't it?"

"Spend ing years down here... suppose, once you've got the hang of the thing, you'd be afraid to face the outside world again," Whiteley said thoughtfully. "But what makes you sign up for such a consignment in the first place—or don't you know what you're letting yourself in for?"

"You're told you're going to spend a well-tended five years in semi-solitary confinement. The pay's good. The agent who first makes the contact picks his type carefully. To many of us it represents a challenge. I suppose most of us here are introverts, and the question

'Have you enough internal resources to be able to bear your own company for half a decade?' seems to us important enough to be worth finding out the answer. The opportunity comes on a tray, you fall for it. And in five years you've changed; you could never again bear the grinding friction of the outside world. It's getting too fast out there, Whiteley, too big, too noisy."

Whiteley shook his head. "It's a point of view," he said. "You should know. But to endure nothing but 'arid monotony...'"

"NOT ARID!" Farthingdale said. "Far from arid! Monotonous certainly, but I showed you its first fruits in Richards' room. The monotony is the secret; maybe now that you're down here, you'll take in the theory better."

"As I was indicating on our drive over, much of man's activity is merely a flight from boredom. The desire to travel, to explore, to go faster, further; the desire to excel; to beat someone up; the desire for a candy to chew on, or a ring to flash. You can attribute

those desires to various causes—but behind those causes lies another, a basic thrust called boredom, or rather the flight from it. It encroaches into every sphere of human life.

"Wars would never be fought if the citizens really had something to absorb them at home; they could never tear themselves away. You may think of hunger as a basic, but look at the vast variety of dishes and menus the nations have accumulated: it's as much a desire for variety—a flight from ennui—as a simple desire to eat. Think of the complicated snobbery of wines, and tell me if that has anything to do with simple thirst."

"That reminds me..." Whiteley began, but was out-talked.

"You mentioned sex as a basic thrust," Farthingdale continued, "Yet many sexual activities are nothing more than a flight from boredom. How many women—and men—marry just because they can no longer endure the humdrum tedium of their homes? What are art and music—and alcohol and drugs—but flights from the overpowering wet

blanket of everyday life? Why, what makes a tiny child risk its neck to get up and walk? What drives a baby to sit up when it was more comfortable lying down?"

"Stop! Let me guess," Whiteley said brightly. "Could be boredom, huh?"

"BOREDOM!" Farthingdale agreed. "It's the prime mover. What else forces the full-grown foetus to leave the biggest bore of all, the womb? And it's that condition, that rich and fruitful condition, Whiteley, we've recreated here. We've channelled right back to basics."

"And it's just that that sets the balls rolling?"

"Just that! Contact with the basic powers of mind, unhampered by externals. When you come here, you're given nothing else to do. At first, maybe for months, you dodge the idea, you don't believe it. But there is nothing else to concentrate on, so you try it out—just for the hell of it. Eventually they all get round to trying it out. In no time, the balls seem to start rolling on their own. From then on,



there's no limit. You're *interested*."

They sat silent. Whiteley's mind seemed to have come up against a wall. He could not accept the theory Farthingdale had set out—somewhere there was a snag in it: the creatures down here would surely die without some kind of safety valve. Yet he could not reject the theory. He remembered how he had come with Farthingdale in the first place because he did not want a dull evening alone in the flat. And that in turn triggered another

wisp of memory. "The shower!" he said. "You set it on again by psychokinesis."

The irises in Farthingdale's eyes winked yellow like a cat's. His smile was a humourless quirk of the lips. "It was easier than blinking," he said. "You're quite clear about everything now, Whiteley?"

Some curious quality in his tone made Whiteley pause. The beard was trembling. The gray-white hands were trembling. The little man's whole frame trembled, as if with some suppressed ague.

"Sure, I understand, Farthingdale," he said. "What's the matter with you? Are you ill?"

INSTEAD of answering, the other turned towards the microphone. In a flash, Whiteley realized that it had been live during their entire conversation. The Project must have been listening to every word they uttered.

"Did you hear all that, men?" Farthingdale rasped into the mike. His voice was hardly recognizable. "Our visitor understands us now. If you'll come out of your rooms, I'll bring him to meet you."

He stood up, still shaking.

"Come into the hall, Whiteley," he said. "They'll give you a demonstration of some of their powers."

He opened the door. Whiteley was slow; he still did not grasp what was the matter with Farthingdale. But out in the circular hall, the members of Project Tedium were already gathering, moving like fast ghosts out of their cubby-holes. On their faces worked the same ghastly grimace that animated Farthingdale's. And suddenly,

as he stepped hesitantly out to meet them, Whiteley recognized what it was that had them: blood lust.

They were going to murder him.

In no time, he had darted back into Farthingdale's room, slammed the door and wedged the desk tight against it, sending the mike flying.

"Keep back, you mad swine!" he howled in its general direction. "I've got a gun and I'll shoot every one of you!"

As he shouted, he was flinging open the little hatch doors and cramming his shoulders through the opening. It was a tight fit, but he could make it; then he banged his head.

Cursing, he raised his hands and pushed. A non-budging steel lid blocked the bottom of the miniature lift shaft. This was just an office; doubtless Farthingdale's meals descended into his private room elsewhere—so this useless shaft had been sealed off. Whiteley was trapped.

OUTSIDE, they were taking their time, letting him grow thoroughly frightened.

They were making a noise, a sort of wordless vocal shudder. Whiteley gave a wordless, physical shudder and pulled out his gun. The only other escape routes lay through that mob; he could either burst up the stairs and try battering on the strong-room door—in the hope someone would open it before the wolves got him—or he could dash into, say, Richards' room, and try his luck in the hatchway there.

Of the two forlorn alternatives, the latter had to be ruled out. Undoubtedly no escape would be open that way—or Richards might have tried it in his early weeks of boredom. It had to be the stairs.

Whiteley was as wet with sweat as if he had been back in his shower. A charge through that mob did not seem the most inviting thing he had ever done. He circled restlessly round the room, looking for a weapon for his free hand. As he did so, he shouted hoarsely through the microphone, telling them that if they molested him they would all be shot.

In the end, he kicked the chair to pieces and selected the

longest spar from its component parts; then he pulled back the desk and flung the door open.

A dozen faces turned to his; nearly all were bearded. No move was made to rush him, although a sussuration of welcome rose as he appeared. It seemed they were playing into his hands; they had crowded so much to one side of the circular hall that a way to the stairs was left free.

WHITELEY took it. He splurged past the gray ghosts, who made no move to stop him, took the stairs four at a time, and commenced to hammer frantically on the big door with the butt of his automatic. The members of Project Tedium began to flow quietly up the stairs behind him.

"Let me out of here!" Whiteley bellowed. "Let me out!"

"They'll never hear you!" It was Farthingdale. Now hardly distinguishable from the pack of similar faces round him, he stood on the top step but one. "And if they did hear, they wouldn't come, Whiteley. This is all organized with the

consent of the authorities. We have this little game just once a year; you're honored to be this year's subject.

"Remember Ollie Grant? He was your first, wasn't he—the first person whose accidental death was convenient to you. You never killed for tangible, material gain, and you never repeated your methods—so you managed to get away with it. In fact, you made a mistake in only one sense—your last victim was a government agent."

"You can't prove a thing," Whiteley yelled, "and neither can anyone else—because there's nothing to prove, nothing more than everyone knows."

WHITELEY was still hammering wildly. "The authorities won't allow this," he shouted. "They'll fry every one of you!"

"For what? An accident? You volunteered for dangerous work, Whiteley; the form you signed included a waiver, a very inclusive one."

"That's a lie," he shouted. "I never signed any such thing!"

Then, suddenly, he remem-

bered—a form to be signed. The clerk had given him two copies, then shook his head and apologized as he went over to the files and pulled out what looked like another one. "This has to be signed in triplicate," he said. "Good thing I remembered—you'd have had to make another trip." It was one of those humid, sticky days. The clerk put a paper over the printed matter for Whiteley's sweating hands to rest on so that the form wouldn't be smeared.

"I never volunteered to be murdered...that isn't legal...the whole thing's illegal..."

"Who said anything about murder?" laughed Farthingdale. "This is our annual catharsis. We've more power than you think. You see, even *we* get bored down here. We have to have a safety valve, to discharge emotion..."

"It's murder!" Whiteley repeated.

"The supreme purge of repressed feelings...you have had experience with that, Whiteley. So have others. Our annual subjects are very carefully selected—like you, Whiteley, they are people

whom the law cannot touch, whatever it may suspect. They all sign waivers, to protect the government in the event of accidents—and I must admit that accidents have happened."

A chorus of mocking agreement echoed him.

AT LAST, Whiteley turned to face them; this, he saw, was going to be the end.

"I'll have the satisfaction of getting *you*, Farthingdale," he said. Baring his teeth, Whiteley raised the automatic, pointed it at Farthingdale's heart, and fired.

Nothing happened.

He flicked another bullet into the chamber, squeezed again. Still nothing. And another. Nothing. And another and another...

There was a giggle in the chorus now.

"Did you think we couldn't stop a simple detonation?" Farthingdale called. "You fool, we can block fission and fusion processes—that's the ultimate goal of our training!"

Whiteley hurled the gun at them; it stopped in mid-air and fell to the floor.

"Better go back to your room," came Farthingdale's voice. Whiteley started to run... then the chair leg pulled itself out of his hands, and dropped in front of his feet. He sprawled headlong.

A tremendous force caught him, buffeted him, lifted him, over the eager, upturned faces. He could see their teeth gleam like eyes. Then he was coming down helplessly among them.

It was downright indecent for a girl who was making an honest living as a stripper to be yanked into the future, where no one wore clothes! Don't miss this hilarious account of

The Bare Facts

by George H. Smith

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Point of View:

THE MOON

by Isaac Asimov

Many stories have been written about human beings on the Moon — yet, none have really begun to describe what you and I would see in the sky if we were on the Moon. Here is a definitive article, showing that the facts — even what we know of them from this planet — far outshine fiction!

illustrated by Emsb

IN MOST ways, the sky of the Moon differs only in details from the familiar sky of Earth. The pattern of the constellations is the same and so is the pattern of the planets. Venus is the “evening star”, the Sun is half a degree in diameter. In most ways, the Moon is still home.

To be sure, our space-traveler, standing on the Moon, will see everything brighter and clearer, because of the absence of an atmosphere. The stars and planets will be uniformly brighter by 0.4 magnitudes, so that a flood of very dim stars not quite visible on Earth will appear. What's more, without



From the surface of the Moon, the Earth is huge in the sky, misty, but very bright.

the atmosphere, there will be no twinkling; the stars will be tiny, unwavering points.

In addition, the Sun will be visible in all its unclouded glory. Without dust in the air to scatter light, the sky will remain black. If we obscure the actual face of the Sun by an opaque disc in the proper position (a kind of artificial eclipse), so that its glare won't blind us, we could then make out the scarlet prominences along the Solar rim and the pearly halo of the corona. And, of course, the stars would be visible, too.

All this, however, is not so much Lunar viewpoint, as merely a non-atmospheric one. Take a balloon to the upper rim of the stratosphere and you can see the same: the brighter, non-twinkling stars, the black sky, the haloed Sun. We've got it all right here on Earth just a few miles from where you're sitting. Of course those few miles are straight up—but that is not the hurdle it used to be.

ONE DIFFERENCE between the Lunar sky and

that of Earth's stratosphere depends on the difference in the Moon's motion through space as compared with our own.

The moon rotates on its axis from west to east, completing one full rotation with respect to the stars in 27.32166 Earthly days. This is the length of the "sidereal month." The effect of this motion, to an observer on the surface, is the apparent motion of all the stars from east to west. A particular star will rise in the east, travel across the sky, set in the west, remain invisible for a period of time, then rise again in the east. The period between the two risings will be 27.32166 Earthly days.

The rate of the apparent motion of the stars is a smooth 13.2 degrees westward each Earthly day, a figure arrived at by dividing 360 degrees (the full circuit of the sky) by 27.32.

The Sun, as a result of the Moon's rotation, also has an apparent east-to-west motion of 13.2 degrees per Earthly day imposed upon it. However, in addition to its rotation, the

Moon revolves about the Sun (in the company of the Earth, of course) in 365 1/4 days, and this introduces an additional complication.

The revolution of the Moon about the Sun is reflected (to an observer on the Moon's surface) in an apparent motion of the Sun from west-to-east. This is the direction *opposite* to that imposed by the Moon's rotation. Since the period of revolution is longer than the period of rotation, the Sun's apparent motion as a result is correspondingly slower; 360/365 1/4, or just about 1.0 degrees per Earthly day.

NOW, THEN, the Sun has one apparent motion driving it to the west at 13.2 degrees and another to the east at 1.0 degrees. The result of the two motions together is that the Sun has a net westward motion of 12.2 degrees per Earthly day. At that rate, it takes 29½ days (360/12.2) for the Sun to make a complete apparent circuit of the sky. The time between one Sunrise and the next on the Moon is, to be exact, 29.53059 Earth-

ly days. This is the *synodical month*, which governs the phases of the Moon and, also, much of our own calendar.

The consequence of this is that a particular spot on the Moon will, generally speaking enjoy a two-week stretch of continuous sunshine followed by a two-week stretch of continuous night. (If you are impatient with my academic way of arriving at that simple statement—what with apparent motions in one direction at one speed, and in another direction at another speed—restrain yourself. It will come in handy shortly in a more important respect.)

EVEN THE Moon's long day and long night, though different enough from our own Earthly experiences, is only a detail. It would take something more than a detail to justify this article, and there is something that is much more than a detail.

There is one thing that is not in the Moon's sky that is a prominent object in our own sky—and that, of course, is the Moon.

There is also one thing that is in the Moon's sky that we, ourselves, never, never see from Earth—and that, of course, is the Earth.

Of course (you're saying to yourself), everyone knows that.

However, judging by the science fiction stories I have read (including, I hastily admit, those I write myself) no one seems to give any thought to how the Earth must really look to someone on the surface of the Moon. Just saying, "He stared at the globe of the Earth hanging in the sky", scarcely seems enough in a field of literature that prides itself on its imagination.

So let's take a close look. Let's pretend that we are standing in the center of the visible face of the Moon (say in the Sinus Medii; i.e. "Central Bay") and look at the Earth directly overhead. Now, what do we see?

IN ALMOST all illustrations I have seen of such a scene, the Earth looks like the globes you may see in a public library. The oceans are blue, the

sharply-outlined continents are a pleasant green. White ice-caps are added north and south. And usually, as a result of unconscious nationalism, it is North and South America that happen to be visible.

But surely this is too simple. An Earth without clouds? An Earth without atmosphere?

The atmosphere that scatters light when we look through it, making a blue sky for us, would also scatter Earth's reflected light and make a bluish Earth for a spectator on the Moon. What's more, the regular wind systems in our atmosphere would set up regular and persistent differences in cloud formations and haze so that the Earth would be a belted planet to our Moon observer, as Jupiter appears to be to us.

What you would see from the Moon then would, most likely, be a bluish-white planet with faint belts of varying widths parallel to Earth's equator. The Earth may be splotted with washed-out greens at some fertile places or faint browns at deserts; it may be a deeper blue when the Pa-

cific Ocean rolls into view. In general, though, drawing a map of Earth from what can be seen from the Moon would probably be a thankless task.

This may be disappointing, but in another respect the classic picture of "the globe of the Earth hanging in the sky" does our planet far less than justice. As a library globe with continents upon it, its full brilliance is neither pictured nor described.

THE EARTH, you see, is a bright object indeed when seen from the Moon. For one thing, the apparent area of the Earth, as seen from the Moon, is 2.85 square degrees as compared with the Moon's apparent diameter, as seen from the Earth, of 0.21 square degrees. In other words, the globe of the Earth is 13 times that of the Moon and would shed that much more light, all things being equal.

But all things are not equal. Both Earth and Moon receive the same intensity of sunlight since both are equally distant from the Sun. However, the Earth, thanks to its atmos-

phere and clouds, reflects 29 percent of the light that falls upon it—while the Moon reflects only 7 percent. The greater reflectivity of the Earth increases its brightness over and above the effect of its greater area. We therefore multiply 13 by $29/7$ to get 54. To that, add 30 percent, since the Moon has no atmosphere to absorb Earthlight, whereas our own atmosphere absorbs that much of Moonlight.

The final figure arrived at, then, is that the Earth, when fully illuminated by the Sun sheds 70 times as much light on the Moon as the full Moon sheds on the Earth. Imagine one of our nights lit up by 70 full Moons and you'll see that the Lunar night is not as stygian as it might be.

Of course, the Sun, as seen from the Moon, would still be 8,500 times as bright as Earth at its best, so we must avoid delusions of grandeur.

BUT THE Earth, as seen from the Moon, is not always fully illuminated. It shows phases to the Moon, just as the Moon does to us, in the same progression and with the

same rate of change. Earth phases are, however, directly opposite to those of the Moon.

When the Sun and Moon are on opposite sides of the Earth, the situation is Sun—Earth—Moon. The lit face of the Moon and Earth both face the Sun, of course, since the Sun is the source of the light. This means that the lit face of the Moon faces Earth as well, and for us it is the time of Full Moon. Simultaneously the lit face of the Earth is facing away from the Moon and only the dark side is toward them. On the Moon, it is the time of New Earth.

When the Sun and the Moon are on the same side of the Earth, the situation is Sun—Moon—Earth. Now, by the same reasoning as above, it is New Moon time on the Earth and Full Earth time on the Moon.

If the geometry of the situation is worked out in detail, it turns out that the fraction of the Moon apparently lit (as seen from the Earth) plus the fraction of the Earth apparently lit (as seen from the Moon) always adds up to 1. Thus,

when the Earth sees a crescent Moon with only $1/8$ th of its visible surface in the sunlight, the Moon sees an almost full Earth with $7/8$ ths of its visible surface in the sunlight.

It is just during the time of the crescent Moon, then, when most of the Lunar surface visible from Earth is dark, that the Earth, as seen from the Moon, is nearly full and sheds the most light. So much Earth-light hits the Moon at the time of its crescent phase, in fact, that some of the Earth-light is reflected back from the Moon in sufficient intensity to be visible on Earth. The unlit portion of the crescent Moon then seems to be lit up with a faint ruddy glow so that the entire circle of the Moon can be made out. (The ruddiness of the Earthshine is due to the fact that it is light that has passed through our atmosphere three times—Sun to Earth to Moon to Earth. Each time, light at the blue end of the spectrum is scattered, leaving what remains to grow redder at each passage.)

IN OLD TIMES, the Earthshine effect during the time

of crescent Moon was known as "the old Moon in the new Moon's arms" and was considered a sign of ill omen.* However, at least once in the history of astronomy it served a good-omened purpose.

When the Copernican theory was first establishing Earth as one of the planets, the conservative opponents of this revolutionary notion pointed out triumphantly that planets shine and that the Earth, as any fool could plainly see, did not. Whereupon the Copernicans said that Earth did so shine, and held up as evidence the phenomenon of the old Moon in the new Moon's arms, which they correctly attributed to Earthlight.

The Moon has a much better view of Earth's phases than we have of the Moon's. Our Moon is obscured by clouds at times; it sets and remains out of sight for half of every day; it looks pale and washed-out when the Sun happens to be in the sky at the same time.

* (Editor's Footnote)

"Last night I saw the new Moon,
With the old Moon in her arm,
And I do fear Sir Patrick Spens,
Will surely come to harm."

— *The Ballad of Sir Patrick Spens*

To an observer on the Moon, however, Earth stays generally in one place. It is not obscured by clouds or by setting, and is unaffected by the Sun, provided the face of the latter is shielded. It changes its phases in full view.

The boundary between the lit and unlit portions of the Earth is not sharp (as is the case of the atmosphere-less Moon as seen from the Earth) but is fuzzy, the fuzzy region marking the zones of twilight and dawn on Earth.

Earthlight would fade away far less rapidly with declining phase than Moonlight does. On Earth, a Half-Moon presents just half the area of light that a Full Moon does. You might expect Moonlight to be half as intense during Half-Moon as during Full Moon. Not so. It is only 1/9th as intense.

THE REASON for this is that the Sun at Full Moon hits the Moon from directly overhead, casting few and short shadows, as seen from Earth. At Half-Moon, the light of the Sun is coming from the side, and the crater shadows

are long (particularly near the terminator, the line where Lunar day and Lunar night meet) drowning out most of the light that would ordinarily be reflected to Earth. (It is for this reason, by the way, that astronomers don't study the Lunar surface at the time of Full Moon. The lack of shadows drowns out the craters. At Half-Moon, though, the view is magnificent.)

The Earth, however, reflects light mostly from its atmosphere and its oceans. There are few, if any, shadows to drown out light as seen from the Moon. Consequently, the difference between Half-Earth and Half-Moon is even greater in Earth's favor, by several times, than is the difference between Full Earth and Full Moon.

During Earth's changing phases, the dark side of the Earth would ordinarily be completely invisible against the black of the sky, as is the case of the dark side of the Moon to us on Earth. At the time of crescent Earth, it might be possible to make out the dim outlines of the dark portion by

means of reflected Moonlight. (The reflected Moonlight would be much dimmer than reflected Earthlight on the Moon; but since there's no atmosphere on the Moon to drown out this dim light, perhaps it might be possible to see "the old Earth in the new Earth's arms".)

The Lunar observer would have the chance to see something on the dark side of the Earth, that we can never see on the dark side of the Moon, simply because Earth has an atmosphere and the Moon has not. I am referring to the Northern and Southern Lights. These should appear as faint and writhing glimmers against the dark of the Earth. I haven't got enough information to be able to tell for sure whether they would be visible to the naked eye on the Moon, but whether by eye or by telescope they ought to make an interesting vision. (We can occasionally spot Northern Lights in the atmosphere of the dark side of Venus—by telescope, of course.)

You might think that the invisible portion of the Earth

would be visible as a "hole in the sky" since it would blank out the stars behind it, but you would be wrong. The Moon's sky would contain about 12,000 stars or one star for every $3\frac{1}{2}$ square degrees, while the Earth's area is 2.85 square degrees, as seen from the Moon. Consequently, the chances that the Earth will be in front of even one star at any particular time are something less than fifty-fifty.

I SAID, IN passing, a few paragraphs ago, that the "Earth stays generally in one place" to an observer on the Moon. Let me explain why this is so, and how the previous exercise in connection with the Sun's apparent motion will come in handy.

The Earth partakes of the general motion of the Moon's heavens, resulting from the fact that the Moon rotates on its axis in 27.32166 days. The rotation imposes upon the Earth an east-to-west drift of 13.2 degrees per Earthly day.

However, the Moon also revolves about the Earth in a period of 27.32166 days. (This

is the sidereal period; that is, the time interval between the moment when the Moon is exactly between the Earth and some particular star, and the moment when it is again between the Earth and that same star.) The coincidence that the time of the Moon's rotation about its axis is exactly equal to the time of its revolution is *not* a coincidence; it is the inevitable result of tidal forces inflicted upon the Moon by the considerably larger Earth.

As a result of the Moon's revolution about the Earth, there is imposed upon the Earth, as seen from the Moon, an apparent movement in the skies from west-to-east (just opposite to the movement imposed by the Moon's rotation on its axis.) But since the Moon's period of revolution is exactly equal to its period of rotation, the imposed west-to-east motion is, in the long run, just equal to the imposed east-to-west motion.

With the Earth under the imposition of two motions of equal amounts in opposite directions, the end result is that it does not seem to move at all.

As a first approximation, we can say that it hangs motionless in the Moon's sky.

This means that on approximately half the Moon's surface, the Earth is above the horizon and is always above the horizon. On the remaining half the Earth is below the horizon and is always below the horizon. (I'll have a small modification to make of this later.)

As seen from the Earth, all this is reflected in the fact that the Moon only turns one face to us. This face is varyingly lit by the Sun, so that the Moon shows various phases. However, whatever the division of light and dark, the face we see is always the same face.

LET'S GO back to our position in the Sinus Medii, with the Earth directly overhead. As I have just explained, it will remain (more or less) directly overhead. We are thus faced with a sky that contains two prominent bodies—a motionless Earth and a Sun that rises and, after two weeks, sets. How are these two bodies interrelated?

For one thing, the phases of the Earth would depend directly and, to an observer on the Moon, obviously on the position of the Sun.

The Sun makes a complete apparent circuit of the Moon in precisely the time it takes the Earth to go through all its phases once. When it is midnight on the Sinus Medii, the Sun and Earth are on directly opposite sides of the Moon. The lighted portion of the Earth, facing the Sun, also faces the Moon. At midnight, it is consequently the time of Full Earth on the Sinus Medii.

As the Sun approaches the eastern horizon toward the forthcoming Sunrise, the lighted portion of Earth also drifts in that direction, continuing to face the Sun, so that the Earth grows gibbous.

At Sunrise (which is, of course, just about one Earth-week after midnight) Earth is in the Half-Earth phase, its eastern half being lit. Then, as the Sun slowly climbs higher in the sky, the lit portion of Earth continues to creep around to face the Sun and what can be seen of it slowly

shrinks to a thinner and thinner crescent. At noon, when the Sun is more or less directly behind the Earth, only the thinnest crescent can be seen (if the Sun's face is blocked out) and it is the time of New Earth.

Then, as the Sun sinks again, light starts creeping about the Earth's western edge, the crescent grows fatter and fatter. At Sunset, it is Half-Earth again, the western half being lit up this time. Then, as the night progresses, the visible portion of Earth's globe waxes further until at midnight it is Full-Earth once more.

Of course, all this time, Earth is spinning on its axis and experiences a twenty-four hour alternation of day and night. The apparent motion of light about the Earth in monthly intervals, as seen from the Moon, is but the illusion born of the Moon's revolution about the Earth.)

NOW WHAT happens when the Sun passes the Earth in the sky. Does it go directly behind Earth? It would do that

every time if the plane of the Moon's revolution about the Earth were the same as that of the plane of Earth's revolution about the Sun. The two planes are, however, not the same. They are tilted to each other at an angle of about 5.1 degrees.

If the two orbits were projected against the starry background of the sky, they would appear like two hoops set slightly askew. The orbits would cross in two places and these crossing-places are called "nodes." Near the nodes the two orbits are close together against the sky. Ninety degrees from the nodes, there is a maximum separation of the orbits.

When the Sun passes the Earth in the Moon's sky, there will generally be no apparent collision. The amount by which the Sun misses the Earth will depend upon the position of Earth and Moon in their orbits. The further they are from the node, the greater the separation of Earth and Sun. When a full ninety degrees from the node, the apparent distance between the centers

of the Sun and the Earth as they pass would be 5.1 degrees. The distance from the surface of the Earth to the surface of the sun would therefore be 3.6 degrees. This means that the Sun may seem to pass far enough from the Earth so that seven more Suns could be placed, side by side, in the gap.

However, if Earth and Moon are closer to the node, the Sun does not seem to miss by that much. If the Earth and Moon are within a certain distance of the nodes, the Sun does not apparently miss at all, but passes partially or entirely behind the Earth.

An eclipse of the Sun as seen from the Moon might be imagined as disappointing at first thought. After all, on Earth, a total eclipse of the Sun means the sudden flashing into visibility of the corona. On the Moon, the corona is there all the time. Where then is the beauty of the eclipse?

Ah, but let's imagine in detail.

THE SUN approaches the Earth at the time of New Earth, of course, as I ex-

plained. It approaches from the east so that the only thing that can be seen of Earth is the thin eastern crescent (supposing the glare of the Sun to be blocked out.) The crescent is four times as long as the Moon's crescent as seen from Earth, and it is probably a distinct blue in color against the Moon's black sky. (The light you would see in such a crescent would be mostly blue light scattered by Earth's atmosphere, so you would be literally seeing a bit of Earth's blue sky against the Moon's black one.)

The Solar corona would strike the Earth's globe first. It would not reappear on the other side of the blue crescent, as the casual observer might first expect. It would remain hidden behind the invisible bulk of Earth's globe.

More and more of the corona is hidden until the globe of the Sun itself makes contact and is in turn bitten into.

It would take just about one hour for the Sun's globe to disappear completely behind the Earth after initial contact. It is then that the spectacle ought

to be at its height, and I'm not sure if I can describe it adequately.

With the Sun directly behind the Earth, none of the Earth's globe ought to be visible. However, the Sunlight is refracted about the edge of the Earth on all sides by Earth's atmosphere, so that the rim of atmosphere about the dark globe springs to life. What you see now is a large ring of light in the sky. Furthermore, this light is not reflected scattered light, but the transmitted light of the Sun. Since the atmosphere is scattering the blue mainly, it is the light at the red end of the spectrum that gets through, and the ring of light is a bright orange in color.

SURROUNDING it would be the edges of the Sun's corona projecting from behind the Earth, so that the ring of light—sharply marked off on the inner surface—would fade into pale white on the outer surface. (Someday, although I won't live to see it, there will be special tourist excursions to the Moon to catch eclipses.)

Finally, after some three

hours (in the case of a direct hit) the Sun begins to emerge from behind the western edge of the Earth's globe and the best is over.

Of course, if, at the moment of the eclipse, the sections of the atmosphere, which are visible to an observer on the Moon, are filled with clouds, then little light will get through. The orange circle in the sky will appear dim or incomplete. Unless the science of weather forecasting is far advanced over what it is now, this will not be accurately predictable and Moon tourists who are cheated by an ungorgeous spectacle will raise terrible howls. (I predict that there will be insurance offered—"eclipse insurance", if you like—to make up for this.)

As seen from the Earth, this phenomenon takes on the form of an eclipse of the Moon. As our Earth gets in the way of the Sun, the Moon, which shines only by reflected light, darkens. At the height of the eclipse, the Moon may still, however, be plainly visible as an orange globe, lit up by the light of the orange ring in its

sky. It may be so visible, in fact, that observers will find it hard to believe that there is an eclipse on, and will feel cheated. When the atmosphere rim is cloudy, though, the Moon will fade further, and in some eclipses it may actually be invisible.

What seems to an observer on the Earth to be an eclipse of the Sun (when the Moon passes in front of the Sun, or the Sun passes behind the Moon, as you please) is spectacular enough, but it seems nothing at all to an observer on the Moon.

To the Moon observer, the Earthly view of an eclipse of the Sun would be represented by the intersection of the shadow of the Moon with the Earth. But it would be the very tip of the shadow that would fall on Earth, a small dot of darkness curving over the Full Earth's glowing body. (Such an eclipse would always take place at the time of Full Earth.) It would not be visible without a telescope.

BUT BACK to the vision of the Earth in the Moon's

sky. We are still in the Sinus Medii and the Earth is still overhead.

But is the Earth truly motionless up there in the sky? Actually, not quite. To be sure, its east-to-west drift due to the Moon's rotation about its axis is balanced by the west-to-east drift due to its revolution about the Earth. However, this balance is only perfect in the long run; at any particular moment, the balance is generally not perfect.

The rate of the Moon's rotation about its axis is quite steady, so that the apparent east-to-west drift of the Earth's globe is also perfectly steady. However, the rate of the Moon's revolution about the Earth is *not* steady. The rate of revolution varies according to the distance of the Moon from the Earth, and that varies considerably. The Moon is 221,463 miles from the Earth at perigee (i.e. the point of closest approach) and 252,710 miles from the Earth at apogee (i.e. the point of furthest recession.)

When the Moon is in the perigee half of its orbit, it

moves about Earth at a speed faster than average, and the west-to-east drift is consequently a bit greater than the east-to-west drift. On the other hand, in the apogee half of its orbit, the Moon moves more slowly than average, and the west-to-east drift is somewhat smaller than the east-to-west drift.

The net result of this is that the Earth seems to drift eastward as the Moon approaches perigee—at a faster and faster rate until it reaches perigee; then at a slower and slower rate as it leaves perigee behind. Half-way between perigee and apogee, the two drifts match and the Earth is momentarily motionless. Thereafter, it begins to drift westward, faster and faster, as the Moon approaches apogee; then slower and slower as it leaves apogee behind.

AT THE END of one revolution of the Moon, the Earth is back where it was precisely, so that in the long run it doesn't move. However, at only two instants each month is it truly motionless in the sky.

All this is known as the Moon's "geocentric libration in longitude" since we, of course, interpret the motion from the effects as seen from the Earth. From the Earth, it appears that the Moon, during the course of its revolution, swings a bit in one direction so that we can see a little around its eastern edge; then a little in the other direction, so that we can see a bit about the western edge. This swinging to and fro reminded the observers of the oscillation of a scale, and the word "libration" comes from the Latin word for "scale."

There is also a "geocentric libration in latitude" on the part of the Moon.

This is caused by the fact that the Moon's axis of rotation is tipped a bit to the plane of its orbit. (Our axis is also tipped and by considerably more than the Moon's is.) This means that at one extreme of the Moon's orbit we can peer over its north pole a short way, and at the other extreme over its south pole a short way.

To an observer on the Moon, it would seem that the Earth drifted northward during one

half of the month and southward during the other half.

THE COMBINATION of the two shifts of the Earth's globe, east-west and north-south, would mean that in the course of one day-night interval on the Moon, the Earth would traverse a complete ellipse. The exact shape of the ellipse would vary because the perigee of the Moon shifts its position, rotating the full distance about the orbit in under 9 years. This means that the east-west shift would synchronize in different ways with the north-south shift, giving sometimes thin and sometimes thick ellipses; slanted northeast-southwest at some times, and northwest-southeast at other times.

The elliptical motion would be clearly visible against the stars, extending through as much as sixteen degrees. This means that if the Earth were exactly at zenith at one time, it might be one-sixth of the way down toward the horizon two weeks later.

IT IS BECAUSE of these motions, by the way, that we

see more than half the Moon's surface. We see 59 percent of it at one time or another, as a matter of fact. There is only 41 percent of the Moon's surface that we have actually never seen.

Now this has one consequence for an observer on the Moon's surface that I have never seen mentioned in science fiction—or, for that matter, in any book of astronomy.

If there is only 41 percent of the Moon's surface we have never seen, then conversely, there is only 41 percent of the Moon's surface that never sees Earth. But the geometry of the situation demands, then, that there is only 41 percent of the Moon's surface that *always* sees the Earth. The remaining 18 percent of the Moon's surface, lying between the lucky 41 percent and the unlucky 41 percent, *sometimes sees Earth and sometimes not*.

In short, there is a "twilight zone" on the Moon with respect to the visibility of the Earth.

Standing on the Sinus Medii, the Earth is overhead. Travel east, and the Earth drops toward the western horizon.

Travel in any direction, and the Earth moves in the opposite.

If Earth were really motionless in the sky, it would drop until it reached the horizon, and would sink below as you traveled toward the side of the Moon not visible from the Earth. There would, of course, be a thin belt on the Moon, about 35 miles wide and circling the Moon, in which the Earth would be forever just at the horizon, part above and part below.

THIS IS *not* the situation as it is, however. Earth is *not* really motionless in the sky; it moves in a sizable ellipse. There is therefore a belt 250 miles in width, circling the rim of the side of the Moon visible from the Earth, in which (barring obstructions due to crater walls and so on), the Earth would sink completely below the horizon.

There would thus be Earth-rise and Earth-set on part of the Moon.

In the very center of this twilight zone, Earth would remain entirely above the horizon for about 13 days; spend a day

in setting; be completely hidden from view for 13 days; then spend a day in rising. During its thirteen day stay above the horizon it would, of course, go through half its phases, varying from Half-Earth to Full Earth back to Half-Earth, for instance.

The exact pattern of the visible phases of the Earth would change with time as the position of the Moon's perigee changed. There would be places in the belt and times, for instance, when the Earth would rise as a thin crescent. On very rare occasions, it might rise as an eclipse of the Sun reached totality and then it would be the flaring orange ring that would lift itself above the horizon (getting only part of the way up by the time the eclipse was over.)

What a pity, then, people who talk about trips to the Moon always talk of the scenes of unutterable bleak desolation that would meet the eye.

What a pity none of them think to look at the Moon's glorious sky.



New Model Spaceman

Novelet

Three perfectly-trained men had died in the first three rockets sent around the Moon. Unless the fourth got back alive, the space program would be finished. So Dwight Hovland had to stake everything on a hunch — send up a man who'd had no training whatsoever!

by Theodore L. Thomas

“**T**HIRTY seconds. Thirty seconds.” The voice burst from the amplifier and swept across the sandy plain and swiftly faded, gobbled up by the great flat emptiness. One tiny echo bounced back from the long low building that squatted nearby in the desert.

Almost unheard, the echo whispered “*thirty seconds*” to the towering rocket that gathered itself for a mighty leap into the beckoning heavens.

The desert air was heavy with stillness and with waiting. Then a small sound intruded, a sound that slowly grew in volume until it became recogniz-



able as the sound of a racing automobile engine. Louder it grew, and louder.

"Twenty seconds. Twenty seconds." The booming voice briefly submerged the roar of the car. But then the voice faded and the roar of the approaching car took command of the silence.

The car careened around the edge of the low building, tee-

tering dangerously. It slid sideways off the macadam road onto the sand, spewing a fan-shaped sheaf of sand high into the air. It recovered and sped straight to the rocket, bounding up onto the concrete pad, and finally shrieking to a stop near the base of the rocket.

The back door flew open and a man in a uniform leaped out. He looked around him briefly, turned toward the low building, and waved both arms over his head. He shouted something but it could not be heard. He stood there and waved and shouted, a seeming pigmy alongside the immensity of the great rocket.

The loud speaker clicked and came to life. "Take cover. We can't stop it now. Get out of there or you'll get yourself..."

"Ten, nine, eight..." The count-down began, drowning out the warning voice.

THE MAN on the pad stretched both arms toward the building, palms out, and vigorously pushed at the air in an effort to stop the launching. The count-down inexorably continued. At the count of two

the man turned and jumped back into the car and slammed the door. Gears crashed as the driver jammed into reverse. But the count was zero.

An explosion from the base of the rocket, a high singing roar, hot white fire, a shaking of the ground, and the rocket inched its way up. Ten feet in the air and the roaring column of flame touched the edge of the pit. Instantly the fire swept over the entire pad like a monstrous ocean wave hungrily reaching out for the shore. It overtook the moving car, swirled around it at headlight level. Only for an instant it remained there, but the olive-green paint flashed off and the fenders warped and the four tires puddled and soggily exploded. Then the giant rocket streaked high on its course and the screaming roar of it softened to a dull thunder.

The man kicked open the door of the smoking car and stepped out to the pad. He glanced around, waved at someone in the car to follow him, and broke into a run toward the building. He ran well.

He reached a door at one

end of the building and threw it open. An armed guard confronted him. The guard glanced at the familiar face and at the three stars on the shoulders and snapped into present arms. The general returned the salute, pushed passed the guard, and ran down the hall. He turned aside finally and flung open the door to a room that hummed with activity.

LONG ROWS of metal-cased equipment lined the walls, some of it studded with blinking lights, some with dials, some containing frosted circular screens with wriggling worm-lines dancing across the face. Here was the whole array of monitoring and control equipment. And in front of each piece sat a man, some wearing earphones and listening intently, some adjusting dials, some talking, some sitting silently staring at quivering needles.

One man in the room was standing. He was tall and thin, and he stood in front of the central piece of equipment watching it closely. He stood stooped, and his thin brown

hair hung limply down over a high domed forehead. He wore earphones, and a long thin cable trailed behind him connecting the phones to a jack in the wall behind him. The man was so deep in concentration that it seemed as if he had forgotten to breathe.

The general slammed the door shut behind him and strode over to the tall man. He grasped him by the shoulder of his shirt and half turned him toward him. The tall man did not respond; his face remained fixed toward the board. He impatiently tried to shrug off the restraining hand.

The general turned him again, more harshly this time, turned him and said, "Hovland, where's Medbury?"

The lines of concentration on Dwight Hovland's face eased somewhat and his eyes focused on the general. "What?" he said. "Medbury? He's in the rocket."

The general dropped his hand. He was a tall man and he seemed to grow taller. Coldly he stared at Hovland. Then he said, "Hovland, you're under arrest."

Hovland turned back to the board, but the general swung him back, viciously this time. "Hovland," he snapped. "Have you lost your mind? Do you realize you have committed murder? You'll hang for this."

Hovland looked at the general. He deliberately reached up and pushed an earphone to a position behind his right ear. "General," he talked slowly. "Wait until I bring this boy down. You wait; then you can have your hanging. Don't bother me now. There is a lot of work to be done."

THE GENERAL'S temper crackled close to the surface, closer than he ever allowed it to come. His voice when he spoke was almost hoarse from suppressed tension. "All our work, everything we've tried to do for ten years, all of it you've finished. We'll never recover, not now."

Hovland looked at him and said in his slow way, "We were finished anyway, weren't we, General?" He glanced at the board, and spoke into a lapel microphone, "Tighten it. Tighten that course. Ah. A shade

more. That's it." He peeled off the headset and dropped it alongside the board and turned and headed out the door. He moved with a measure of deliberation that seemed to call for the placement of every foot in a predetermined position on the floor. Yet he walked swiftly. His arms swung not so much in the direction in which he was walking as off to one side.

The general followed him, tight-lipped, and rigid. They went out into the hall and down it a few yards and into a smaller room. A lone man sat before a huge monitoring board watching the maze of needles and lights and dials and screens. A microphone rested on a ledge before him and a speaker poured a low rumble out into the sound-proofed room.

Hovland stopped behind the man and the general stepped beside him. The general said, "Hovland, why did you do it? Why did you send an untrained man up in that rocket?"

Dwight Hovland's eyes methodically traced a path over the maze on the board. With-

out turning his head to look at the general he said, "It's the only chance we've got to make the trip. You've seen what's been happening. Three men killed, one after the other. Three of the best, most highly-trained men we could get."

The general said, "Now you're going to kill a fourth, and without giving him any chance at all. Medway is a farmer. He has never seen a rocket before. Have you gone mad?"

HOVLAND stepped forward, touched the man at the board on the shoulder, and pointed to a needle that had drifted slightly from its green mark. The man moved a dial under the needle and the needle drifted back where it belonged. Hovland stepped back.

"General, have you ever wondered how our unmanned rocket made it around the moon and back?"

"We were lucky."

Hovland waited before he answered, "No. We made it because we sent up a rocket with only one master."

The general stared at him coldly without speaking.

In due time Hovland continued. "We equip a rocket with enough control equipment to take it around the moon and back. Then we put in a pilot trained enough to take it to the moon and back without equipment. So we have a rocket with two masters, and each one solves problems in a different way. A man does not think like a machine, and a machine does not think like a man. Each can find a right answer but it may not be the same answer."

Hovland started to step forward again, but the man at the board made the necessary adjustment.

Hovland settled into his customary stooped position and continued. "So when something happens, the pilot takes the action he thinks is right, and the control equipment takes the action it thinks is right. Sometimes it is the same action, but sometimes it is not; they pull in opposite directions and they never know until it is too late." For the first time Hovland turned his head to look at the general. "That's what killed those three men, General."

The general's eyes nar-

rowed. "You're talking rot and you know it. Who else thinks this way? Anybody else agree with you?"

Hovland looked back at the board. "I did not tell anyone about it. I knew their reaction would be just what yours is. I sent some men out to find a man like Medway without telling anyone what I wanted him for."

THE GENERAL said, "They'll close down this project now, you know. Congress won't stand for having you deliberately kill a man. We'll never get another chance to send a man around the moon, not in the lifetime of any of us here. We were losing the support of the people, anyway...now you do this."

"The death of one more man would have ended the project in any event; we are finished unless this rocket makes it. I did what I thought would give us the best chance of success. This man won't be fighting the control equipment: he'll make it. *He'll make it.*" Hovland watched the man at the board make another adjustment.

The taut lines in the general's body were softening, but the result was even more foreboding than the anger. An aura off chill enveloped him, clothing him like the fog around an iceberg, something that could be almost felt and seen.

"Hovland," the general's lips hardly moved. "I have stood behind you all along. I've fought for money for you, I've kept the press, and Congressmen, and all the other dignitaries contented. I've got you the men and material you needed. I've helped you in every way I could. I believed in this moon object, Hovland. I was willing to stake my career on it—everything I've worked for for thirty years. We might have worked this out, you and I. We worked out everything else together."

The general's stare was a thing of ice. "Now you've done this, destroyed the moon project and all the men and women who've worked on it. I will see that you pay for this, Hovland. A scientist—even one such as you—cannot carry out a murder in the name of science; you can't kill an innocent boy, no

matter what your reasons. I'll make you pay for this, Hovland." The general's voice was flat, emotionless.

HOVLAND'S eyes clouded with pain, but he kept his face toward the board so the general could not see it. This was not the worst. This hurt, but it was not the worst. Dwight Hovland had been through the worst, and after that nothing mattered. You make your choice and you carry it out. It is simple, really. You do what you know is right. And what matter if the heart twists inside you and the world teeters toward you and everything you hold dear crashes down around your head. You do what you know is right.

The man at the board said, "Acceleration off, five seconds."

Hovland stepped up to the panel and placed his hands on two dials and waited. The room grew tense; the very air seemed to hold its breath.

A red light winked out on the board; the low rumble over the loud speaker faded. Hovland turned a dial to increase the volume and the occasional

crackle of static snapped through the room. He lifted a hand microphone from the console and held it near his mouth. He spoke, gradually increasing the power as he did so. "Medway. Can you hear me? Medway. Frank Medway. Can you hear me?" Over and over, gradually taking the volume up. Then he stopped to listen. He stepped the speaker power up further, and the snap of the static grew louder.

There was a thud, clearly discernible over the speaker, and something that sounded like panting. Another thud, and a grunt or a groan, sounding tinny over the speaker. Then there was silence for a moment.

Suddenly, crashing out of the speaker and resounding through the room before Hovland could turn down the power came a voice with a country twang in it. "Well now, this here ain't so bad a-tall."

HOVLAND turned the dial and said, "Medway, can you hear me?"

"Why shore, Mistah Hovland. I can hear you right good."

"How do you feel?"

"Right fine. A mite sore in spots, but nothing serious."

Hovland looked puzzled. "Sore? What are you sore from?"

"Well, what it was, all that pushing and shoving on a man on these here hard floors. I tell you, I ain't never seen a floor as hard as this one was when that pushing started up."

Hovland stared uncomprehendingly, but the general understood. Moving swift as a panther the general crossed to Hovland, and for the second time in fifteen minutes seized him by the shoulder and spun him around. "Hovland," he said, and the anger was in his voice again, "do you mean you did not even teach that boy to use the acceleration pad? You let him lie on the floor during acceleration?"

Hovland's eyes widened, and his mouth fell open. He twisted his shoulder away from the general's hand and flicked two switches on the board. He spoke into the microphone. "Henderson, where are you?"

There was a click over the speaker and a voice said, "At the main board, Chief."

"Henderson, didn't you tell Medway how to use the acceleration pad?"

"Certainly, Chief. I pushed him on it and told him to stay there just before the two-minute warning."

"Did you tell him what it was for?"

There was a pause. "Well, no, not exactly. I didn't have time. It took a little more... well, I just never could get to it." Another pause, and then came a sudden rush of words. "Chief, he didn't know how to work a can opener. He'd never seen a can opener with a handle you have to turn. I had to spend ten minutes with him just teaching him how to use a can opener. I had to do it that way or he never would have been able to open the food."

"Did you tell him how to handle the switches?"

"No. Like I said, I didn't have time enough to tell him anything except about the can opener. You said he wasn't supposed to know anything so I didn't think much about it. I told him to leave everything alone and then I had to get out of there. The two-minute warning went."

"**R**IGHT," said Hovland, and he switched the speaker back to the rocket frequency in time to hear the last few bars of a plaintive wail: "...care of, the Birmingham jail."

"Medway," said Hovland. "Can you hear me?"

"Why shore. I hear you real good."

"Fine. Don't touch anything until I explain some things to you. Let me think a minute."

"You go right ahead, Mistah Hovland. I ain't going nowhere."

Dwight Hovland placed the mike on the console and stood staring at it contemplatively. The general said, "Hovland, this is disgusting. You haven't given that boy any chance at all; you could have killed him on take-off. You..."

Hovland waved him quiet and picked up the mike. "Medway," he said. "Listen to me carefully. Can you hear me?"

"Shore."

"When you sit in that seat you are facing a section of wall that is covered with little lights. Do you see it right in front of you?"

"Shore do."

"All right. Along the left-hand edge, the *left-hand* edge now, do you see a row of little switches running up and down."

There was no immediate answer, so Hovland said, "Those switches are right in front of your left shoulder. There are nine of them in a row, right on the edge there. Don't you see them?"

"Oh, yes, I see them."

"Good. Find the middle switch. Count five switches up or down. Do you see the one in the middle?"

ANOTHER pause, then, "Well, yes."

"Good. Be careful now. Put your fingers on that middle switch. Got it?"

"Shore."

"All right, now. Push it to your left. Just push it over."

"That's all? Just push it?"

"Yes."

"Well, if you say so. Don't seem like..." The speaker went dead. Hovland gasped and started to say something into the microphone. Then realizing it was futile he slowly put the mike down, and looked at it.

The general said, "So soon, Hovland?"

Hovland shook his head and started to speak. A light began to flicker on the board. Hovland changed the setting on a dial, picked up the mike and said, "Hovland."

A voice said, "Jones, Chief. We've lost radio contact with the rocket. Power's off, no broadcast at all."

"I know," said Hovland heavily. "Medway hit the wrong switch. Stand by. We can only hope he thinks to turn it back on."

II

HOVLAND stared at the board, his tall frame drooping more than ever. The general stared at Hovland. The man at the board checked his dials in a half-hearted way and then fixed his eyes on a small red button of glass that was conspicuous because of the absence of any illumination behind it. A dead eye; lifeless; the spark gone out, and with it the spark in a nation's people, the hopes of a brave new world.

It is not a good thing to fail when there should be success. When people believe in you and support you, when they expect you to succeed, when you expect to succeed yourself, there is nothing to say when failure closes in. It is not a case of bucking up and shrugging your shoulders and starting all over again. A great man assumes great problems commensurate with his moral structure. He becomes committed to those problems and their solution; he and they are intertwined inseparably, irrevocably, into a single entity in which the man stands for the problem and the problem stands for the man. When such an entity triumphs, the triumph is complete for all time; immortality for the man results. And when such an entity fails, there is nothing left.

He who steps forward to lift men to their destiny had better lift them there. If he does not, chill oblivion awaits, a strange kind of oblivion reserved solely for his kind of man. It is not an oblivion of mere forgetfulness. Rather it is an oblivion of hate and shame, fed by

the fury of a thwarted people. And from it there is no recovery.

Dwight Hovland faced it. A renowned scientist, a highly-skilled administrator and coordinator, there was no one better equipped to guide Man in his first hesitating step into space. Furthermore, for all his brilliance Hovland was a simple and direct man, plain and humble, with the child-like air of innocence and enthusiasm about him that sometimes seems to accompany true genius. People warmed to him on sight, trusted him, wanted to help him. They willingly placed in his hands the management of Man's greatest attempt to break out of his environment.

Hovland immediately showed that the trust was not misplaced. He appeared before Congress to attempt to justify the huge expenditures of public funds that would be necessary to send a man around the moon. That most hard-boiled of human institutions—the Congressional committee—listened to him for three days, questioning him, probing him,

forcing him to justify what he said was needed. Very soon the cool fire in Hovland had seared every one of them; the members found themselves fighting one another to drive home Hovland's simple statements. When it was over the committee gave him, not what he wanted, but more. A new quip appeared in the country: other men get the key to the city; Hovland gets the key to Fort Knox. So everyone knew that Hovland was the right man for the job. Hovland and Man's greatest adventure, the two were one.

HOVLAND stared at the board—at the dead red piece of glass with no light behind it. Just like that, a light goes out and a man goes out with it, as simple as that. Was there a difference really? In a thousand years would it matter whether a light went out, or a man? Or a million men? Hovland stared at the board, silently.

Simultaneously—it was impossible to tell which happened first—the light winked on and Medway's voice filled the

room. "...there. I done pushed it both ways. Anything else you want, Mistah Hovland?"

With a shock, Hovland realized that Medway did not even know what he had done. Hovland picked up the mike and said, making an effort to keep his voice steady, "Don't touch that switch again, Medway. Don't touch it again. Push the switch over right above it. The one above it. Push it over and leave it there."

"Shore. There you are. You all right, Mistah Hovland? You sound kind of funny."

"I'm fine, just fine." Hovland's eyes watched the face of the TV tubes on the panel. There was a flicker of gray, a finger of light, a glow that grew and spread. Then the tubes steadied and Hovland could see what the cameras on the rocket saw. Deep space burning bright. The sight did not move him. He had, after all, seen it before, many times, when the unmanned rocket made the same trip.

Hovland said, "Good, Medway. That's all for now. Don't

touch anything else on the ship. Relax, and call out if you want anything. We will be listening."

"All right, Mistah Hovland."

STILL HOLDING the mike, Dwight Hovland switched in another circuit and said, "Radnor, how does it hold to the course?"

A deep voice answered, "Not bad, Chief. Accurate within a quarter of a degree-fifteen minutes of arc."

"Fifteen minutes?" A pause. "The rocket will be off course over a thousand miles when it gets to the moon. Calculations ready to correct it?"

"We're making them now, Chief."

"Keep me posted." Hovland cut the switch, put down the mike, and took a deep breath. He turned to speak to the general, but was surprise to find him gone. He tilted his head to one side and rubbed the side of his face with his upper arm. He walked to a series of chairs placed against the wall behind the man at the board and wearily dropped into one

of them. His sigh was loud, and his body drooped more than ever, hurting to the bone with weariness. It had been a long night and a long morning for Hovland.

The door opened silently and the general entered followed by a paper-thin man in overalls and a scraggly beard. Hovland watched them approach.

They stopped in front of Hovland and the general said, "Mr. Medway, this is Doctor Hovland."

Hovland looked from the bearded man to the general and back again. "Medway?" he said. "Is this Frank Medway's...I mean, is this the same..."

"Yes," said the general. "This is Frank Medway's father. He was looking for his son and the security police brought him to me early this morning. That is how..."

"YOU A doctor?" interrupted Medway.

"Yes."

"Well, now, lookee here." Medway put his left hand on his right shoulder and moved

his right arm in a circle. "Comes a cool morning, I can't hardly move this arm. Stiff. You take a look at it and maybe give me some medicine or something for this here shoulder. Fix it up, huh?"

Hovland sat back in his chair, a slight smile on his lips. "I'm sorry, Mr. Medway. I'm not that kind of a doctor. I can't fix you up."

The beard pointed almost straight out in front as Medway looked at him in disgust. "You call yourself a doctor and you can't fix this shoulder?"

"I'm not that kind of a doctor."

Medway turned to the general and said, "What I can't stand, a man going around saying he's something he ain't. Doctor. Huh." He turned back to Hovland. "I come for my boy. Where's he at?"

Hovland looked at the general, reproach in his eyes. Then he looked at Medway and said, "He is not here, Mr. Medway. He is up on the rocket."

"I don't know nothing about no rocket. That boy went off yestiddy wearing my hat. I

want it back. Now where's he at?"

Hovland sighed and pulled himself to his feet and said, "Here, you talk to him." And he led the way over to the microphone. He spoke into it. "Medway, here's your father." Then he handed it to Mr. Medway.

"Pa? Pa?" Young Medway's voice came over the loud speaker.

MR. MEDWAY looked wildly around and then glared at Hovland. "This ain't no telephone. I seen a telephone and this ain't no telephone. What..."

"Now, Pa, don't go getting yourself all riled up 'bout nothing. What you do, you talk just *like* a telephone in that thing."

Mr. Medway still looked suspicious, but he stared hard into the microphone and said, "Boy, you bring my hat right back here. You had no call to go off with it like that. You bring it right back."

"Can't, Pa. Leastwise not right now. I'm taking right good care of it so don't you bother none."

The beard began to quiver, the watery eyes to narrow. Dwight Hovland stepped up quickly and said, "He'll be back in a couple of days, Mr. Hovland. You will get your hat back then." And he gently took the microphone from Medway's hand.

The old man glared at him and snorted, "Doctor. Huh." Then he turned and marched over to one of the chairs along the wall and angrily flung himself into it.

Hovland placed the mike on the console and wearily turned to follow him. He had taken two steps when he heard a choked voice behind his gasp a single word, "Chief."

He spun around, his eyes racing over the board. He saw it immediately. A row of three red lights, rapidly winking on and off. He jumped back to the board and picked up the mike and set a dial. "Watkins," he snapped. "Can you isolate it?"

"Air circulator, Chief. Temperature, carbon dioxide, and oxygen, all off normal. The only thing that can cause all

those at once is air circulator failure."

"I know. I know. But what's wrong with it?"

A pause, then, "Can't tell, Chief. But you'd better get that man moving around while we try to figure something."

HOVLAND nodded to himself and cut back to the rocket. "Medway, you hear me?"

"Shore do, Mistah Hovland."

"Look, you've got to move around." A sudden thought struck Hovland. "Have you got that hat right there?"

"Shore do."

"Good. Fan yourself with it."

"How's that?"

"Just fan yourself with it as if you were hot."

"Well, if you say so." There was a brief wait, then, "That the way?"

"Are you fanning?"

"Yep."

"Good. Don't stop for anything until I tell you."

Hovland dialed and said, "Anything, Watkins?"

"Motor failure, we think.

"We're trying to get it going."

Hovland slowly put the mike down and watched the three winking lights. He gradually became aware of the fact that the general was standing alongside him. "What is it?" asked the general

"Air circulator out. If we don't get it going that boy will suffocate in his own carbon dioxide. Zero gravitation up there, so his breath hangs around his head..."

"I know," interrupted the general.

Watkins' voice came over the speaker, "Chief, we've got it traced to the motor. Must be a little oil or dirt on the switch. The only thing we can think to do is double the voltage momentarily; maybe that'll get it started. What do you say? Shall we risk it?"

HOVLAND slowly reached for the microphone, his mind racing. It could end here, now. Air circulation had to be maintained. Yet the only chance of maintaining it was to trigger all the circuitry in the entire rocket; this could be done from Earth. A radio im-

pulse from Earth would send a single surge of current through all the wiring in the rocket by tripping a radio-microswitch. Yet it was a last-resort technique. Somewhere, something might burn out. A soldered joint with some entrapped impurities, a connection not quite tight enough, any of these could arc and break under the excess voltage.

Dwight Hovland touched a dial and said, "Medway, how are you getting along?"

"Well, right good, I reckon. What it is, it's a mite hot in here. I don't see no window I can open. You got windows in this here thing?"

"No. Wait a minute. We'll see if we can fix you up."

Hovland turned the dial and said, "All right, Watkins. Try it."

Watkins said, "You sure you can't get that man to fix the motor himself? It might be safer."

"Not a chance. Go ahead."

"Okay."

There was a wink of a small yellow light down in the corner of the console in front of Hovland; just that and nothing

more. Hovland stared at the three blinking red lights, waiting for them to blink out. There was no change.

Two minutes went by. Hovland felt rather than saw the general's stare. Hovland kept his eyes fixed on the flashing lights. After three minutes he spoke again into the microphone. "Try it again, Watkins."

"Right."

THE YELLOW flash came again, but Hovland hardly noticed, so intent was he on the three flashing lights. When it happened it took several seconds to register. One of the lights—the temperature light—flicked out and failed to come on again. Hovland let out a deep breath and leaned forward on his hands. Then the carbon dioxide light remained out, then the oxygen. The board was quiet.

Hovland dialed and said, "That got it, Watkins. Keep a close watch to see if we did any damage."

"Right, Chief."

Hovland turned to find a chair and sit down. His hands

were shaking and he rubbed them together. The general said, "Lucky again. How long do you think you can keep it up?"

Hovland dropped into a chair and said, "I can keep it up long enough to bring him home. I never thought it would be easy."

The general looked over at Mr. Medway and Hovland followed his glance. The old man was asleep in his chair. His mouth was open showing yellowed pointed teeth, and his breath whistled in and out. The long hairs in his moustache bent back and forth in his breath like seaweed swaying in the waves.

The general began a measured pacing, and Hovland settled wearily deeper into his chair. The room fell silent save for the rush of static over the radio and the soft clump of the general's heels.

AN HOUR passed. A technician came in to relieve the man at the board. There was a whispered conference between the two, then the new man settled himself into the straight

chair. Suddenly Medway's voice came over the speaker. "Mistah Hovland, you there?"

Hovland came out of his lethargy and jumped across the room for the microphone. "Yes, I'm here. Everything all right?"

"Shore is. What it is, it's right cool in here. Don't seem like good sense to keep up this here fanning no more."

Dwight Hovland put his right hand to his forehead. Then he said, "All right. You can stop fanning now." He put the mike down and looked at it. A little thing, a tiny forgetfulness, that's all. But it is the little things gathered together that make up the big things. For the first time a trace of fear touched a cold finger on Hovland's spine. What other little thing had he forgotten? Slowly he stepped back to his chair. He felt the general's gaze, and this time he turned to meet it, prepared freely to accept the condemnation he knew would be there; the general was not one to forgive an oversight. So Hovland steadied himself and met the general's eyes.

What? He stopped in his steps. The chill stare was different, not accusing, warm almost, wide-eyed and understanding. Then Hovland understood. The general had always been a just man, as strict with himself as he had been with others. In this situation—this oversight—the general had had all the information that Hovland himself possessed. Yet the general, too, had forgotten and had stood by while Medway went on fanning himself. The general, too, had slipped. And in his eyes now was blame, but blame turned in on himself as well as on Hovland. In this sharing of a common blunder there could be nothing but understanding and a sharing of mutual fault. Hovland felt strangely comforted as he dropped into his chair.

III

THE HOURS went by without incident. Young Medway and Hovland talked occasionally. It took Hovland fifteen minutes of careful explanation at one point in order to instruct

Medway again on the use of the can opener with the rotating handle. The time lapse in the conversations with young Medway became apparent as the rocket began to draw close to the moon.

There was one tense moment. A large drifting piece of rock measuring roughly three feet in diameter was detected on the rocket's radar. The ground crew spent four minutes calculating its trajectory. The results showed that it would pass so close to the rocket there was no way to tell whether it would hit or not.

It was a situation they had faced before. The first rocket up with a man inside had chanced on just such a piece of cosmic debris. But then the man had tried by judicious bursts of power to avoid the trajectory. He succeeded, but he placed himself on a spiral orbit that led eventually to the surface of the moon. The flare of light from the explosion was plainly visible through low-power telescopes on Earth.

But this time, there was nothing to do but sweat it out. The watchers on Earth saw the

wayward rock sweep past the rocket fifty feet away. Medway was eating at the time and was not aware of the glittering death on the other side of the hull.

When it was over, Hovland could no longer stand on his feet; his knees felt weak and the muscles in his legs ached. He dropped into a chair as if he would never get up again, and he slumped there slowly rubbing his hands over his face. His shirt was wet around the collar and under the arms, and the front of it was grey and streaked and rumpled. He dropped his hands, limply, into his lap. His cheeks were sunken and his red-rimmed eyes hurt; blinking made it worse; the eyelids seemed only to scratch. Time went by, and then Medway was around the moon. The figure-eight course was half completed.

HOVLAND dozed fitfully in the chair and after awhile he regained the strength to go to the door and call for more coffee. When it came he shared it with the general and old Medway and the man at

the board. Medway did nothing but sleep, eat, and chew tobacco, and he kept the chew in his mouth throughout all his sleeping and eating. Hovland watched him pour the steaming hot coffee past the bulge in his cheek and then run the back of a hand through the mass of hair that surrounded his mouth. Hovland stared at him and wondered what this man really thought of his boy. Did he think of him at all? Did he ... Dwight Hovland shook his thoughts away from it. There lay pain.

Hovland looked at the general, sipping his coffee carefully, squinting against the heat of the liquid. The general's uniform was immaculate, not a wrinkle anywhere. His face was clean shaven and he looked cool and comfortable and fresh, as though he were just starting a new day. Yet he had been through all that Hovland had, never leaving the room save to step into the small bathroom at one end. Hovland wondered vaguely what there was about a man that made it possible for him never to show the results of

monstrous hours of hard work and strain.

The general never laid aside his jacket like other men, never loosened his collar. But when other men were disheveled and grimy, the general—after matching them hour for hour of toil—looked ready for the parade ground. Hovland had seen it before, but this time the contrast in the appearance of the general and himself reached the point of absurdity. Hovland finished his coffee, checked the board, and returned to his seat.

The hours passed as Medway made the return trip. Hovland checked the board, and dozed, and checked again, and kept tight reins on the entire ground crew, and dozed some more. And as the rocket began to draw closer to Earth he gradually became aware of an unfamiliar contraction of the throat—a choking sensation that made it difficult for him to breathe freely. And with it there was an undue sweatiness on the palms of his hands and an odd tendency to jump when a voice sounded in the long low room. Hovland reflected

on what might be wrong with him. He sat outside himself and looked in. Soon he knew. He was frightened. The closer his dream came to being realized the more frightened he became. Now this was absurd.

HOVLAND sat slumped in his chair and stared across the room at the board with its winking lights and its television screens, and he thought. Frightened, why frightened? It was working as he had planned. What was there to fear?

As he thought the question he saw the answer. Yes, that was it. With success so close it became more difficult to accept defeat. When accomplishment is remote it is easy to be brave. But when accomplishment is at hand it is hard, so hard, to see it torn away. Ah there is the source of fear.

Hovland saw the source of fear, and knowing it, he set about orienting his mind to find a way to overcome it. But as he considered the problem the more frightened he became. He might make it. By God he might make it. And if

he did...if he did. Then the choking sensation came back and the sweat broke out on his hands and the beginnings of a tremor coursed up his body. He forced his mind to other things; he tried to doze.

His overtaxed body responded; a lassitude stole over him. With it came a lack of conscious control over the workings of his mind.

HE DRIFTED then, drifted back a few days to the time he locked himself in the storeroom with a chair and the silence. He had left everything behind, left the general to explain to the others why the third man had died on the third attempt to send a manned rocket around the moon. Hovland needed to think, and so he locked himself in a store-room with a chair and the silence.

Something was wrong, fundamentally wrong. Jackson crashed on the moon trying to avoid a meteor. Henderson froze in terror at a tiny meteor puncture until anoxia claimed him. Chapman tried a course correction and somehow suc-

ceeded in creating an explosive mixture that tore the rocket apart. Yet each of these men was doing what he had been trained to do. What had gone wrong?

In the chair and in the silence Hovland stared at the blank wall and tried to pin down the elusive factor. As he thought, he was struck by the irony of the fact he felt no great sorrow for the men who had died. He had sent them to their deaths yet he was able to contemplate their deaths without a trace of personal involvement. Why was that? He knew them, liked them. But he seemed to think of them more as...as machines. Yes, that was it, machines. The rockets were filled with nothing but machines. The trouble all happened when the man-machine tried to take over from the machine-machine.

Hovland considered the concept and a slight smile crept unbidden to his lips. And then—full-blown and complete in all its parts—the answer burst in his mind. It was then that he saw that they had been sending up rockets with two

masters aboard, the one almost as good as the other. And when they pulled in opposite directions—disaster. That was it.

Hovland sat back in the chair to test his theory. Man versus machines; it had never worked well; they had always failed each other. An automobile is a harmless thing until a man sits at the wheel and makes it bow to his command. Strange things happen then, with death the constant victor. An airplane now, a more highly-refined machine. Put a man in it and you often have a joyous combination. But what is this thing called pilot error? How often had a pilot not trusted his instruments? And how often had the plane failed the man?

THE HOME, where toasters burn and mixers cut and stoves explode and washers mangle. Man and machine, one or the other was always ahead. Except in as complex a device as a moon-girdling rocket. There the race was about even, and who was to judge which one should take command at

a time of emergency? And in space there were always emergencies. Ah.

What was needed was a way to break the impasse. Set up an imbalance. Strip the rocket of its complex gadgetry. Put a trained man in a simple rocket. Or—and Hovland sat bolt upright—put a simple man in a complex rocket. There, that was the way to keep control; that was the way to eliminate the two-master situation in space. Hovland leaned back in the chair and the silence and tested the concept in his mind. He saw nothing wrong with it. It was risky, but basically sound.

Hovland stirred in his chair in the long low room. The lassitude was deep in him, but he was not quite asleep. Almost unconsciously he noted that the board was the way it should be. He began to doze, and he fought it, for he knew what was coming next. He had kept his mind closed to that, but it was on him now. He could not prevent himself from falling into a light sleep. And it began.

He had reached the conclu-

sion that the only way the rocket could make a successful trip was to place in it a man with so little knowledge that he could not possibly control the rocket no matter what happened. But dared he do it?

DWIGHT HOVLAND had seen the signs. Support for the rocket project was about gone. Another rocket would not fly, not for many years at least; you do not kill three men and keep popular support. Further, Hovland knew he could never convince people of the rightness of destroying the balance in the man-rocket system. There had been hue and cry years ago on the sending up of a helpless dog. What would happen if he sent up a helpless man? Even the general—Hovland's good right arm—would balk at the certain public reaction, and he certainly would never agree to sending up such a man in secrecy; the general was incapable of doing a clandestine act. Yes, so Hovland had to do it alone. He sent out his men to find a man that fitted the description he gave them. Then, not quite

positive that he would go through with it, he went home.

He walked in the door of his house with the problem on his mind. Doris was sitting on the sofa reading to the three children. There was a flurry of activity and screams of "Daddy" and the youngsters hurled themselves at his legs. Hovland stopped and stared down at them as though he had never seen them before. In fact, he realized, he never had. Not through the eyes he now saw through. He squeezed them to him and they wriggled and stepped on his shoes and twisted his trousers crooked. He looked over their heads at Doris. Her smile faded as she saw the expression in his eyes. He bent down quickly and kissed the two girls and pressed his cheek against the boy's face. Then he said, "Well, how was everything today?"

Nothing could be understood from the outpourings of explanations that followed. Hovland dragged the three to the sofa.

"I heard about Jack Chapman," Doris said. "I'm sorry."

Doris had a way of saying

simple things that nevertheless conveyed a great deal of meaning. Her simple "I'm sorry" contained a heart-deep sympathy that left nothing unsaid that ought to be said. Hovland nodded.

HE SAT AND chatted with the children as they played on the floor and on the sofa. He watched the boy go back to work on a block fort—noted the close-cropped hair and the rounded cheek and the clean intelligent eyes so clear that the whites were blueish. Flesh of his flesh, no, more. His breath, his heart, his very life sat there on the floor and built that fort. *What was he doing to him?* Hovland could stand it for himself—could face up to the killing of a simple man in a rocket. But that boy would pay too. And these girls, and this woman. They would all pay through him. Could his boy ever go through college, ever set up a career of his own with a father who had followed a senseless idea to another man's death? And the girls. What would become of them?

Hovland was not a wealthy

man. It took money to do the things that had to be done. And if he were wrong, he would have to face more than a mere lack of money. There would be complete and utter disgrace, so complete that it would smother his family. Hovland had no delusions about that. When a man takes on a great problem and assumes the trust and confidence of the people, he may not blunder. He who steps forward to lift men to their destiny had better lift them there. A failure—and what is worse, a senseless failure—will produce an oblivion of hate and fear and shame from which there can be no recovery.

Hovland sat on the sofa and watched. When a child came by him he reached out and pulled it to him, and hugged it. And gradually his mood spread throughout the family. The children tended to cling to him and Doris watched him with open concern in her eyes.

It was the boy who noticed first. "Mommy," he said. "Daddy's crying."

THERE WAS a silence of disbelief, and then the

children climbed up around him. The little girl patted his cheek while the older girl, frightened, put her head on his shoulder and began to sob. Doris placed her arms around all of them. They did not speak. They clung together throughout a swift eternity. And in this amalgamation of spirit, what was in the one passed to the others and was there diffused, and being diffused, was the more easily overcome.

The terrible moment eased and the group gradually drew apart. No word was said, nor was there need for any. The fusing was complete, not of older with younger, but of the separate parts of a single entity burning bright in its individual units, yet creating more fuel from a drawing together.

Hovland smiled, and this time the smile was complete; the pain was gone. He knew now what he had to do; he had really known it all along. A man must do what he knows is right. Great accomplishments call for—nay demand—great risk, great sacrifice. Dwight Hovland knew what he

had to do. The rocket must go up.

He sat and watched his son play with a fire engine that carried a large bell. The boy loved to ring it. *Clang, clang*, it went, and the sound strangely disturbed Hovland. Something was wrong. *Clang clang* went the bell.

Clang clang sounded the deep-toned bell in the long narrow room. Hovland stirred in his sleep in the chair and then sat bolt upright. The alarm bell aboard the rocket. He glanced wildly at the board. It was all wrong; the lights that should have been steady were blinking and the ones that should have been out were on. There was a major disaster aboard the rocket.

IV

IN ONE BOUND, Hovland was at the board. He seized the mike and shouted into it, "Medway, can you hear me?" Over and over he called, then he listened. The clamor was deafening. The dull booming sound of the bell

blended with a hollow roaring whistling sound.

Hovland did not realize that the general was standing at his side until he heard the general say, "What is that background noise?"

At first Hovland thought he meant the whistle, but as he listened he heard another rasping noise that rose and fell, almost unnoticed in the background. He shook his head in bewilderment and said, "I don't know what should be causing that. I'm not even certain what the whistle is, but I know what it might be. Wait a minute."

He glanced at the clock, and dialed, "Schmidt, what is it?"

"Looks like a meteor puncture, Chief. I'm not certain, but everything points to that. He's got a few minutes to plug it up, but he better get busy."

Hovland looked at the general and dialed back to the rocket. Once again he called to Medway, and once again there was no answer.

The general said, "Maybe your speaker's dead on the rocket."

Hovland pointed to a series of lights and said, "No. Circuits are all in order. It's just that Medway doesn't answer." As he said it his blood ran cold. He looked at the general and saw in his eyes the same thought: the meteor must have hit Medway on the way through the ship.

The mike felt leaden in Hovland's hands. He started to speak into it again, but he closed his mouth and set it down heavily on the console. His shoulders drooped.

A voice said in his ear, "What's all the furse about?"

Dwight Hovland turned and saw old Medway, sleepy eyed, beard atangle, and scratching himself on the stomach with both hands. Slowly Hovland said to him, "We can't...we can't reach your son."

The old man cocked his head to listen. Then he chuckled and said, "Tain't no wonder. There ain't hardly nobody can get that boy now."

Hovland turned to stare again at the mike. He tasted again the sour flavor of despair. Almost he did not hear the old man continue, "No,

sir. When that boy sleeps he really sleeps."

A FULL SECOND passed before Hovland grasped the meaning. He swung to Medway. "What? You mean he's asleep?"

"Why shore. Can't you hear him snoring there?"

They listened. And now they understood that rasping sound that rose and fell in three-second cycles.

The general said, disbelief in his voice, "You mean he can sleep through *that*?" And he waved at the uproar emerging from the speaker.

"Shore. That boy can sleep through anything. Why once back to home we had this here flash flood and the whole house got floated two three mile down the valley and..."

"Medway." Hovland was shouting into the mike. "Medway, wake up. Medway. Medway." The general leaned forward and joined in. They called for a full ten seconds while the old man watched them in amusement. Then the man at the board rose and began calling too. The three

voices on full volume had no effect whatsoever.

During a lull the old man pointed his beard at the mike and said, "You can't do it thataway. Only one way to wake him up. Move over."

They looked at him and moved aside. He stepped up and with his beard resting on Hovland's hand he called into the mike, "Hongry."

Over the clang of the bell and the roar of the whistle they heard the rasping noise falter. There was a series of faint choking sounds, and then clearly over the hubbub they heard young Medway's voice say, "Pa? Vittles ready? What? Whar am... Oh. Pa, you tricken me again; you out there?"

The old man stepped back from the mike, shaking his head so hard his beard flounced from side to side. "That boy. All he thinks about, sleeping and eating." He leaned toward the mike again and said, "You take care of that hat, now."

"Don't you worry none, Pa. Ah'll...wait a minute now.

There's a turrible lot of noise in here."

HOVLAND pulled the mike to him and said, "Medway, Medway." There was no answer. Hovland was about to call again when suddenly the whistle stopped, as if cut off by a switch. Hovland watched a dial and saw the needle that indicated cabin pressure climb again toward the normal pressure of 14.7 pounds per square inch. The clanging stopped, and a static-ridden silence came from the speaker. The board passed through a stage of flickering until all the lights were normal.

The listeners could hear Medway bumping into things as he floated back to his seat. They heard the sigh of relief as he reached it. Then they heard him say, "Man can't hardly hear himself think. Say Pa, yore hat's doing real good. I found a little hole in the wall here, making a turrible racket. Put yore hat on it and she stopped. It's up there real good, can't hardly pull it off the wall either so it'll stay there and don't you worry

none. I'm taking right good care of it."

Hovland looked in open-eyed amazement at Medway and said, "What kind of hat is that?"

"Coonskin," said the old man. "Oh she's a mite wore mebbe, hair gone offin it. But man and boy I had that hat forty year and I don't want nothing happening to it." Medway looked up and down Hovland, from his shoes to his hair. He sniffed and said, "Doctor, huh," and turned and walked back to his chair and dropped into it and seemed instantly asleep.

The general and Hovland looked at each other, and Hovland was too tired to see that there was warmth in the general's eyes.

The general said, "Will the hat seal the hole?"

Hovland dialed and said, "Schmidt, how big was the puncture? Figure it yet?"

"Yes, Chief. There was only one hole, so at the rate the pressure fell off the hole had to be about one-half an inch in diameter. Say, that's the darndest way to repair a punc-

ture I ever heard of. Think it's patentable?"

HOVLAND grunted and dialed him out. He said, half to himself, "Half inch diameter, quarter inch radius, so πR^2 squared equals about three over sixteen or about one-fourth square inches. The pressure is, say, fifteen pounds, so fifteen times one-fourth equals fifteen over four, about four." He said aloud to the general, "The pressure on a half-inch piece of the hat is about four pounds; it'll hold it easily. Coonskin, it's probably well-cured leather by this time."

The general looked over at Medway asleep in his chair and said, "Yes, it is probably nice and greasy, too, so it should give a good tight seal."

Hovland looked at the clock and the general followed his gaze. The general said softly, "He will be spiralling in for a landing in another three hours."

Hovland did not answer but walked slowly over toward the chair in which he had been napping. There was no spring

in his step; he lifted each foot as if with great effort. His head was down and his shoulders drooped. His shirt was out in the back and his stubble-covered face was lined with deep creases. Dwight Hovland was the picture of a broken man. The general started to walk over to him when the man at the board gasped, "Chief." Hovland spun around.

The board was dead; every light on it indicative of the rocket circuitry was out; every dial conveying information from the rocket read zero.

Hovland stood immobile. The general jumped to the mike and called, "Medway, Medway." Then he dialed and said, "Schmidt, what is it?"

"Don't know, Chief, er, General. Everything's dead on the rocket. Power terminal loose maybe. Happened so fast we can't tell."

THE GENERAL set the mike down on the console and turned to face Hovland. He had not moved; he simply stood and stared at the board, too numb to think coherently. The rocket was heading toward

Earth out of control. So here it ended, so close too, so close to success. He had been almost right. But *almost* right—as opposed to *right*—is failure.

The general said, "Is there anything we can do?"

"Absolutely nothing," said Hovland heavily. "Without contact of any kind with the rocket there is absolutely..."

One by one the lights on the board winked on and the needles quivered and moved to their usual positions. The wash of static sounded in the speaker and then came Medway's voice. "That. That's a mite better. You thar Mistuh Hovland?"

Hovland made no move to go to the mike so the general turned and picked it up and said, "What happened there?"

"Don't rightly know. What it was, the lights went out for a spell and I kept a'waiting for them to go on but they didn't so I up and give this here big thing a kick. That turned the trick."

The general gently placed the mike on the console, turned to look at Hovland and said, "He kicked it. He 'gave this

thing' a kick. And he fixed it."

Hovland nodded, stepped over to his chair, and dropped limply into it. For a moment he sat and stared at the floor, then he leaned forward and placed his face in his hands. The general paced back and forth, his hands clasped behind him, straight and tall and cool looking in his immaculate uniform. He stopped and nodded as if to himself, and then went over and stood in front of Hovland. "Dwight," he said. "Dwight."

Dwight Hovland did not respond so the general leaned over and placed a gentle hand on his shoulder. "Dwight," he said again.

Hovland lifted his face from his hands, sat back, and looked up at the general. The general was shocked at what he saw there. Despair and hopelessness were written plain to see. Complete defeat dominated Hovland's face, a face usually alive with vitality and intelligence. "Dwight," said the general gently. "All you have to do is land him now, and you've done it. It's almost over. Just bring him in."

Hovland dropped his eyes to the buckle in the center of the general's tunic. "You don't know what you are saying, Henry. Landing is the most difficult part of all. We'll never get him down. We've almost lost him—I've lost track of the times. There's a loose connection somewhere on the rocket. We'll never get him down." Hovland shook his head and said dully, "You were right. I never should have sent him up in the first place."

"Dwight, I was wrong; look how far you've brought this man already. You have shown us that we were sending up the wrong kind of man. Don't you see that?"

"You don't seriously think I'd ever send up another untrained man, do you? After this trip? Why, we've just been lucky. We could never do it again."

The general looked at Hovland in surprise, and then said, "You are more tired than I thought. You don't see what you've proved."

A flicker of interest appeared in Hovland's eyes. "What do you mean?"

"Why man, we've been giving them the wrong kind of training. We've been sending up trained rocket pilots—men schooled in flying rockets and in navigation. That's what gave us the two masters you talked about. We had a man and we had equipment both designed to do the same job. It does not work. We should have trained our men to do nothing but *maintain the equipment.*"

HOVLAND'S dulled mind began to quicken. He considered, and gradually was able to focus all his attention on the problem. Slowly he stood up. He rubbed a hand across the stubble on his chin in a familiar gesture. He raised a hand, index finger pointed up although he stared blankly straight ahead. He said, and it was apparent he was thinking out loud, "We built a rocket loaded with all the control equipment we needed to get it around the moon and back. In effect we built a robot. We built a robot but then we put a man in it to fight it. I should have seen it; the man should spend his time seeing that the

robot works properly instead of trying to do the robot's work. That's it. That is the answer."

"Yes," said the general. "That way both the man and the robot are working together toward a common end. You don't have this balance you were talking about."

"Henry, I'm grateful to you for pointing this out."

"You'd have seen it, Dwight, once you got over your fatigue. In any case, your mention of pilots and their instruments was what turned the trick for me. I remember when I was flying during the last war. They tried to build me up as a hot-shot ace, but I knew—and all the other pilots knew—that our ground crews were the boys who were making it all possible. Here you've got the same thing except the pilot is now really a robot; it'll take a man to keep the robot going."

Hovland's face was all smiles. "You know," he said. "We've got this thing licked now. We can send a man anywhere we..." He stopped, the smile fading. "My God, Medway. We've got Medway up

there." His face clouded. "We'll never get him out of this alive."

"Yes we will. You go over and start working on it."

"Henry, I'm serious. We've never yet brought down an intact rocket from the moon orbit; some piece of equipment has always broken down at the end." He put a hand on his forehead. "There it is again. Something always broke down so we decided we needed a man to fly it down when what we really needed was a man to keep the equipment in repair."

"If that is true, then how did you ever expect to bring Medway back?"

Hovland hesitated, then said, "Well, I thought this would be a trouble-free rocket; we installed an improved gyro stabilizer on the flight controls—much more sensitive."

"Go use it."

"But the way that ship has been acting, it will... But I don't know why I'm arguing with you. I've got to try it."

HOVLAND walked over to the mike and turned the volume up. The last strains of

"San Antonio Rose" boomed through the room in Medway's mournful wail. Dwight Hovland shook his head and dialed. Watkins was on again. He and Hovland had a long discussion on the plan to bring the ship down; checking carefully on each detail, occasionally cutting in to another man to get his information and advice. Relay airplanes went up from various sites all over Earth to keep the rocket in constant radio contact with the ground control station.

In twenty minutes all was done that could be done. Hovland looked at the clock and reset his watch. He said to the general, "Just about time for another cup of coffee." The general nodded, stepped to the door, and called for a pot of coffee and some sandwiches. Shortly they came.

No sooner had they been placed on one of the chairs when old Medway woke up, and in one smooth quick motion he was seated in the chair alongside the food. The general and Hovland ate swiftly to keep up, Hovland again noticing that the sandwiches and

coffee did not in the slightest disturb the great wad of chewing tobacco in the old man's cheek. Soon they were done.

Hovland arose, stretched himself, glanced at the clock, and went over to the board. He touched the man on the shoulder, and the man got up and gave his seat to Hovland. Hovland sat down and ran his eyes over the board. He flicked four switches and began calling for check data. Everything was ready. Hovland sat back.

Watkins said, "Five hundred miles, touching atmosphere," and the landing procedure was on. Twenty seven men bent their best efforts toward bringing the first man around the moon safely back to Earth.

The general bent over Hovland and said in his ear, "He is not on the acceleration pad again."

With a muffled grunt Hovland hit the dial and said, "Medway, get on the acceleration pad."

"Why shore, Mistah Hovland. What is it?"

This time the grunt was not muffled as Hovland shouted,

"The bed. Get up on that bed and stay there." He did not wait to hear an answer, but turned back to the delicate task of jockeying the rocket to a landing.

THE TWENTY seven men worked together like a well-drilled football team, each with his own job to do, and each job fitting into the procedure like a brick into a wall. The rocket skimmed the atmosphere and bounced back into space, and skimmed again, and bounced again. Finally it bounced no more; it entered a long supersonic glide high in the upper reaches of the atmosphere. Swift calculations now showed the possible landing areas, so aircraft put off to meet it. Lower and lower the rocket came as it responded perfectly to control from the ground. The velocity fell from supersonic to sonic, then slower still. At Mach 0.5 a control plane picked it up and Hovland sat back to watch the screen as the pilot brought the rocket down in southeastern Montana.

The rocket was within two

hundred feet of the ground when it suddenly dipped its right wing, went into a wild spin, and plunged tail first into the forest. Hovland plainly saw the rocket burst apart from the impact.

He stared at the screen. It showed nothing; the control plane had swept on by. But Hovland stared anyway. He felt the general at his side and looked up at him. "Two hundred feet," he said. "We missed it by two hundred feet. We might just as well have killed him on take-off."

The general rested a hand on Hovland's shoulder. "We are all behind you, Dwight. You were justified in doing this; we know that now. There will be an investigation, but I think we will come through it all right."

Hovland stood up. "No. This was my doing, and I will take the blame for killing this boy. Thank-you, Henry, for your support, but this is mine."

THE CONTROL plane flew back past the scene of the crash. Hovland and the general could see the smoking ruins

lying in the midst of shattered trees. "Could he possibly be alive?" said Hovland.

The general said, "Look at it."

Dwight Hovland nodded. Copters were setting down in a clearing near the wreck and men were running through the woods toward the site. Control switched to a camera on a copter so Hovland and the general got a ground view of the trees that shielded the rocket. Somberly the two men watched the scene.

"What's goin' on?"

Old Medway stood at their side looking at the screen. Hovland and the general turned to him. The general said, "There has been an accident, Mr. Medway."

"Is that right?"

"Yes, there was nothing anyone could do, and..."

"Whar's ma hat?"

"Well, we may be able to get..."

"I say, whar's ma hat?"

"I'm trying to tell you..."

"Will you shut up, young feller? I'm tryin' to talk to my boy there."

"That's what I'm trying... What?"

Hovland and the general swung to look at the screen at which Medway was staring. Coming toward the camera was young Medway. He stepped up to the camera and microphone and heard his father say, "You got my hat with you?"

"Shore do, Pa. Here she is." And he waved a miserable-looking piece of black material over his head.

"Bring her home, Son. Bring her home."

"Shore will, Pa. I'm acoming home right quick." And he turned to walk away.

Hovland found his voice at last. "Wait, Medway. What happened?"

ONE OF THE men who had walked out with Medway picked up the microphone and said, "He was *under* the pad, Chief. *Under* it. That's what saved him when the rocket hit. Here tell him." And he held the mike near Medway.

"Why shore, Mistah Hovland. You tole me to get up on that thar bed so I did and pulled that thar big cover over me. Didn't I do right?"

Hovland said, "You did right, Medway. You did right. Now you go with those men and they'll bring you here. There're a lot of people who will want to see you. You're the first man around the moon."

"I don't know nothin' about that, Mistah Hovland. I'm goin' home. That last bump was a right smart one. I don't want no more like that. I'm goin' home." He turned away.

"Wait a minute. We'll take you home."

"No suh. I'm walkin'."

"Walking. Man it's a thousand miles. You can't walk that far."

"I don't care how fur it is. You ain't getting me to ride in no more of these here contraptions. I'm awalking."

And he turned and disappeared through the trees.





== editorial ==

YESTERDAY'S WORLD OF TOMORROW:

1929 II

THE SUBJECTS treated in the March and April issues of *Amazing Stories* have a contemporary ring about them: anti-gravity, guided missiles, and the atom. The cover of the March issue shows a metal sphere, radio-piloted by the Americans, sailing into the room in which Anthony Rogers, Boss of the Wyomings, is held a royal prisoner by the Hans. Anthony is, of course, the prototype of "Buck Rogers", and the story is Philip Francis Knowlan's "The Air Lords of Han", a sequel to

"Armageddon 2419 AD", which appeared in 1928.

The missiles are called "air balls", a

... sphere of metal about three feet in diameter with a four-inch lens in it, floating slowly down the shaft, as though it were some living creature making a careful examination, pausing now and then as its lens swung about like a great single eye. The moment this "eye" turned upon them, they said, the ball "rushed" down on them, crushing

several to death in its vicious gyrations, and jamming the mechanism of the elevator, though failing to crash through it. Then, said the wounded survivors, it floated back up the shaft, watchfully "eyeing" them...

The air balls are also equipped with two-way radio, and Rogers is able to talk with his friends and his wife, and give them valuable information about his captors. The "Hans" are a military Chinese dynasty which has united the Orient under one vast imperium and has "conquered" the western world.

HAN AIRSHIPS run on broadcast power, which the author explains in a reasonable enough manner, but has to rely on a bit too much magic (including disintegrator rays and gravity repellers) to make him open to criticism. The same can be said of the ultra-electronics of the Americans. It all sounds good enough, but the "science" is rooted in magic—"magic" here meaning supertechnical

things which we cannot judge any more than we can decide how scientific anyone's "time machine" may be, or criticize Doc Smith's inventions in the Lensmen series.

The air balls are another matter. They do not seem impossible or even improbable, except for their use as a weapon to crush and batter—without harming the television apparatus within. Could be in the 25th Century or before, but I'm still inclined to doubt that aspect of them. All in all, though, Knowlan's score as a technical prophet is not too bad; (His rocket guns in the previous story work like bazookas.) the two stories stand up as rather good science fiction, because if we accept his magic, we cannot quibble too much about his implications drawn from it.

OUITE ANOTHER matter is A. Hyatt Verrill's "Into the Green Prism", a two-part serial starting in the March issue. As a story, it reads fairly well (though prolix, slow-moving, and well-nigh plotless).

We have a mysterious green

substance which apparently came to Earth in a meteorite.

"It's almost as hard as sapphire...but it has a remarkable property of cleaving on the plane of its rounded surface when it is struck in certain spots, or cleaving at right angles to its axis if struck on another spot. I have not fully worked out its optical properties yet, but I should say off-hand that its refractive index is fully equal if not in excess of that of the diamond. A lens composed of it should theoretically, magnify an object fully fifty times more than a glass lens of the same formula...."

However, when lenses are constructed, we find that manabinite has other strange and wonderful properties; a prism of manabinite, when subjected to certain vibrations (which our characters find can be produced by a violin) reduces objects upon which it is focused to microscopic size. Our heroes discover that an entire village of natives, which vanished centuries ago, is right

here beneath their feet, as it were; they discover it under the manabinite lens.

Then we learn that the reduction works only upon animal matter; metal and stone is left behind...

AT WHICH point Mr. Ver-rill's credibility sinks to the vanishing point, too. "Into the Green Prism" falls into the "two-way stretch" type of story that Dr. Macklin discussed in the November 1956 issue of *Science Fiction Quarterly*. While our wonderful crystal reduces objects instantaneously and in exact proportion—thus avoiding the painful and fatal action which would necessarily follow upon taking any of Ray Cummings' reduction drugs and pills—all the pitfalls of microscopic human beings remain.

But that is by no means the worst. Only animal matter is reduced; everything else, including metal, is left behind. Now metal doesn't exist merely in nice lumps, or finished products. So if all metal is left behind, then our Indians arrived in smallness as very white corpses, all iron in their

bodies (to specify just one metal necessary for the human body) having been left behind. (Remember the Nevian iron-accumulating dingus in "Tri-planetary"?)

THE ANTI-GRAVITY device in Cyril G. Wates' "Face of Isis" turns out to be an ancient Egyptian chemical formula, by means of which Pharaoh apparently went to the Moon. The inscription on the casket found by our heroes reads; when translated:

"Let him who would follow the flight of the omnipotent Pharaoh, make for himself a chariot of brass like unto the design upon the bottom of the casket. And the floor thereof shall be of cedar. And it shall be placed in the pit that is beneath the floor of the temple.

"And when the Divine Mother unveileth her face at the full, let him fast and purify his heart and offer sacrifice at the altar. Let him do these things from the going down of Ra to the sixth hour thereafter. Then let him enter into the bra-

zen chariot and strew upon the floor thereof, the powder that is within this casket.

"And when the face of the Divine Mother looketh down upon him through the roof of the temple, let him take the fleshburner and pour it upon the powder which is upon the floor of the chariot. Then he shall be gathered unto the Divine Mother, Isis; even unto the mighty King, Kut-Amen-Pash, who hath gone before."

THE TEMPLE has a long shaft in it, at the bottom of which the chariot of brass is supposed to have been placed. Courtland reads some inter-planetary stories to the Professor, in order to suggest ideas to him, but the prof isn't impressed.

"I am not objecting to the ideas, but to the lack of them... These space flyers all go the same way—straight up! Whereas, if you cut off the effect of gravity upon a body, that body will not go up at all!"

"Not go up!" exclaimed Courtland. "Then where will it go?"

"Along of course!... Suppose you mounted an electromagnet on the edge of a large wheel and caused a piece of soft iron to adhere to one pole of the magnet. When the wheel is rotating, in what direction would the piece of iron move, if you suddenly shut off the magnetizing current?"

... "Why, at a tangent to the rim of the wheel..." but... that shaft in the Dibel el Sheetan pointed straight up."

"... That was because the High Priest knew nothing about the reason for making it any other way. As a matter of fact, the Pharaoh's chariot or coffin, whichever you like to call it, never went through the hole in the temple roof at all.... When it started from the bottom, it traveled very slowly until it reached the mouth, level with the floor of the temple. Then it flew off, not vertically but horizontally, just skimming the floor."

their space flier on level tracks on the top of a hill. There remains to identify the "flesh-burner" cited in the inscription; the Professor decides that it is sulphuric acid. (Other preparations are sensibly arranged according to knowledge available to science fiction writers in 1929.) At last they start; the Professor pulls the switch which will release the acid and start them on their flight.

There was a slight hissing as the sulphuric acid flooded the trays beneath the floor. For an instant nothing happened. Then there was a rending crashing, roar. The chariot rocked and trembled as if under the impact of a terrific bombardment. Courtland was hurled to the floor....

When Courtland comes to, he finds himself and the prof still on Earth. The chariot is a wreck, and a clump of trees which had surrounded the vessel have been levelled to the ground, as by a hurricane. The formula didn't work after all.

AFTER THIS sensible deduction, our heroes build

HOWEVER, this is not entirely a reader-cheater. The prof writes to Courtland later

"...I was visiting Dr. John Plattmore in New York. Dr. Plattmore, as you know, is the greatest living authority on hieroglyphics. One evening, while we were discussing the probable extent of chemical knowledge in the Fifth Dynasty, I happened to mention solvents and particularly sulphuric acid.

"But, my dear Professor," exclaimed Plattmore, 'the inorganic acids are a comparatively modern discovery. It is quite certain that nothing was known of them in the period we are discussing.'

"I drew the symbols which I had read as 'Sulphuric acid', in translating the inscription on the casket and asked the Doctor how he would interpret them.

"Literally, of course, they mean "the flesh-burner" or "that which destroys the flesh", but there is no doubt that they refer to one of the caustic alkalies; the

hydroxides of either potassium or sodium. The Egyptian priests must have been familiar with these substances and the methods of extracting them from wood ashes and sea weed.'"

SO, SINCE acids and alkalies are directly opposite in their chemical reactions, the Professor reasons, the use of acid made the area covered by the powder tremendously permeable to gravity; and instead of decreasing gravity to the point of cutting it off entirely, our heroes increased it tremendously. Which explains the crash.

Substances impermeable to gravity—or chemical reactions producing anti-gravity — are magic, of course. But when the story is handled as reasonably as this, you can't complain; it's not as absurd as the usual gravity screen operated by the generators of the space ship, even when they're super-generators!

THE ATOM story in the April issue...well, it starts like this. Professor Flinder has

a new apparatus, which is his own brain-child.

...To the ordinary method of breaking-up atoms, by means of bombarding them with grains of helium, that are discharged by radioactive matter, he added the action of the electromagnetic field of flight and the power of explosion of the miniature charges....

...The professor turned off the light and looked into the microscope. There was the usual scene: like falling stars on an August night, flashes of racing atoms glimmered in the dark field, left and right, in the direction of the current; paths of light intersected the field of sight, crossing in places, indicating colliding, extinguishing and flashing up again... Flinder admitted into the tube of the apparatus a tiny cloud of dust, which was to serve as a stimulator and augments of the process. And at once the picture in the dark field changed. Into the pattern of fiery lines, broke in a volleys of

selves in all directions like explosions of miniature charges. These were no longer integral; the atoms were being scattered into tens and hundreds of fragments by the force of the bombardment...

HALF AN hour later, Flinder no longer sees separate fiery lines or volleys of rays, but the whole circle enveloped in a raging sea of fire. He shuts off the power; the fiery sea continues its rage, but no longer in one direction...

For a moment, Flinder is frightened; he remembers someone saying, "The research work into the inter-atomic energy, is like playing with fire on top of a barrel of gun-powder."

The next morning, he finds he's set off a chain reaction; there's a ball of fire the size of a pea glowing in the lab; it grows as he watches. This is "The Revolt of the Atoms" by V. Orlovsky, and Paul's cover shows a scene near the end, where interesting-looking machines containing electromagnets are surrounding a huge glowing globe in the sky. The heat from the globe is setting fire to a village below.

Well—they manage to put out the fire at the end, and luckily the revolting atoms didn't start throwing hard radiation around, so all is well. Mr. Orlovsky neglects to mention why. It seems that the rapidly-expanding ball is just like ball lightning; one is advised not to touch it.

This pretty much set the pattern for atom-smashing stories prior to 1944. (In stories about atomic power—well, we have it; the tremendous power of the forces within the atom have been unlocked, and harnessed. Dandy!) There were terrible blowups, and chain reactions, when the atom was smashed; the slow-burning of the atomic pile just wasn't thought of, nor the danger of radiation, nor the difficulty in getting an atomic explosion.

THE APRIL 1929 issue of *Amazing Stories* was the last to bear the legend *Hugo Gernsback, Editor*; the May issue had a different publisher and editorial director (although it is believed that Arthur J. Lynch held the title only, and T. O'Connor Sloane actually did

the work; by the end of the year, he was listed as editor). With this issue, you might say that the first era in all-science-fiction magazines came to an end. Mr. Gernsback was not away for long; two months later, the initial issue of *Science Wonder Stories* appeared.

But by then, the pattern had been set; there was little difference between the two rivals, in that both were trying to present fiction which would serve as pedantry while it stimulated the imagination. At the end of 1929, we would see, in a third contender—*Astounding Stories of Super Science*—the pulp invasion of the field; and this competition would force both of the older hands to look to the fiction aspect of science fiction. But the Gernsback magazines showed the most attention to rocketry and interplanetary stories dealing with rocket ships; it would still be a little while before the gravity screen, or gravity repeller, was discarded in the literature.

And here, since a careful examination of the response shows that less than half of the voters favored going farther, we'll close this series. RAWL

baby

by Tom W. Harris

Ever wonder why animals don't come any larger than you usually find them? Or what really might happen if they *could* be made larger?

LITTLE ANDY sported on the floor, diaper-clad, cow-placid, and pig-plump. The balsa blocks were real; he liked the blocks. Further away, things were less real. The edges of the woven grass rug were vaguely beyond perception. The voices of his parents registered mechanically on the apparatus of his ears, but for him they had no mental nor emotional counterpart. This was rather a pity, perhaps, for Helen and Carl were as near as they ever came to having an argument.

"What a cold thing to say about your own child!" Helen was exclaiming. "Really, Carl, you'd think he was one of your laboratory animals!"

"Not at all," said Carl mildly, settling his glasses on his aquiline nose and gazing out past the palms toward the milky river. "I merely observed that an eighteen-months-old youngster is a sort of primal tyrant, and it's lucky that the socialization process can be coordinated with physical maturation."

"And translated into English, that means..."

"It means that given strength to implement their whims, ba-

bies would be monstrous menaces, because they're almost completely selfish. But while they're growing up we drill our ethos into 'em. Socialize them. Go down this river to the Amazon, go west for a couple of thousand miles, and you'll see the Jivaro fathers lecturing the Jivaro boys on the ethos of headhunting. Every culture takes this primal animal, the human baby, and shapes it into what the culture wants or needs. My gosh, Helen, I'm not throwing insults at Little Andy. You and he are about the only humans I really care about. I'm just being objective. I think you're subconsciously annoyed, really, because I'm leaving you to go up the river for six weeks."

"Well, I think Little Andy is a little darling, and I don't care how objective you get." A touch of pride entered her voice. "As for your going up the river, I can stand it. I came out here to help you, had the baby here, and I think I'm a pretty good jungle-wife. If you're going to be the world's leading endocrinologist, it's worth it. I'm pretty proud of you, darling."

He grinned. "You'll be proud-

er when we get to the states. Things I've produced down here. My colleagues won't believe it—giantism without glandular distortion. But they'll have to, when they see Rufus. Did you feed him?"

"Not yet."

"Let's feed the old boy before I go. Tukaja! Hey, Tukaja!"

TUKAJA entered. He was an old Bororo with a splendid physique, over six feet high, wrinkled, and muscled. His face had something oriental in it, especially about the eyes.

"Bring corn and palm cabbage," said Carl. "We'll feed Rufus before we go."

They went to the pen behind the house where they kept the guinea pig. A scherzo of excited whistles greeted them.

Rufus was the size of a large hog, over three feet long. Carl rubbed the animal's coarse, red fur. "Your brothers and sisters are smaller than rabbits," he said, "and you'd outweigh a police dog. You're going to be famous—too bad you're too dumb to know it."

He threw in the palm cabbage and they walked to the water's edge. The Mandas was a

"white river" whose waters, no one knew why, looked milky. "I guess we're ready, honey. Tukaja will go with me past the rapids, then come back. He should be back in six days. I'll be back in about six weeks—maybe earlier if I find plenty of botinga. If I catch enough on this trip to make a decent supply of the drug, our work here will soon be over."

She felt very tired from their long months here, and a little frightened at being alone. The reference to home nearly made her cry, but she smiled, "Good hunting."

Carl lifted Little Andy from her arms and tossed him high. "Take care of yourself, scout. Don't let anything happen to mother. Daddy will be thinking of you."

"Da-da!" gurgled the baby. "Da-da!" He laughed as he rose, space-borne, to fall back into the hands below him.

"Don't forget his medicine," said Carl. "You won't be alone long—T u k a j a will be back soon."

She stood and watched them paddle up the Mandas until they were lost behind the wall of trees at the bend. Just as the

canoes vanished, the gonging cry of a howler monkey rang out in a huge noise that should have come from an animal the size of a dinosaur. Helen shivered; it was like an exulting threat belched out by something barbarous and unknowable to man.

She conquered the icy twitch at the pit of her stomach. Anything *could* happen here, in the isolation-buried clearing—but nothing would. There was always the telephone, installed four months ago, and the rickety wire led down through the thick jungle to the trading house of Pablo Morenos in the tiny down-river fishing village.

Everything would be all right.

SHE SPENT the hours leisurely, after Little Andy was in bed. She listened to the ringing whistles of the bell-birds and watched the cormorants on the river, and in the evening she read for hours until she nearly fell asleep, keeping out the icy twitch of fear. It was when she was in bed that she remembered Little Andy's tonic.

Her vision bleared by sleep and long reading, she groped for the bottle in the kitchen-labor-

atory, found it, went to the nursery with a candle. She hated to wake the baby. *His face is all innocence, all peace*, she thought. *My sweet baby.*

A teaspoonful, that was the dosage. She gave him an extra dollop to make up for having forgotten. He hardly wakened.

"The only baby we'll ever have," thought Helen as she drowsed off. "May he grow big and strong, and precious."

He did.

That night he woke her up five times, hungry, and the last time would not stop crying until she had given him a second bottle of condensed-milk formula. In the morning she gave him his appetite medicine again, and he drank three bottles of milk and ate a bowl of oatmeal. She felt tired and weak; it had never been so hard to lift him; he had never seemed so heavy. *If the tonic means I'll be up five times a night*, she thought sleepily *I'd almost as soon he he lost his appetite again.*

As she ate her breakfast, she became less woozy. "How could he eat so much?" she thought. "How can he hold it?" He ate almost as much as Rufus, she thought wry.

She stopped chewing suddenly as though what she had bitten on was an ugly thought, and stared straight ahead. Then she jumped up. Andy, in his room, was crying again, "Mum-Mum! Mum-Mum!" amazingly loudly, but she did not go to him. Panic fluttering in her throat, she stepped quickly to the jumble of bottles on the laboratory side of the kitchen. She had replaced the tonic bottle on a new shelf, but when she looked she saw it was on the shelf where it had always been. Birdwings beat her brain as she looked at the bottle she had dosed him from.

He was still crying, and she sprinted to the bedroom, looking down into the crib. He had grown nearly a foot.

Her impulse was to scream for Carl—but he wasn't there. She stood and tried to think, with the loud cries of Little Andy beating on her, and there were not thoughts at all. She stopped trying to think and acted as a mother—the baby was hungry and must be fed.

HE ATE ALL day, dozens of times, and by evening she believed he had grown another six inches. She tried to remem-

ber what she knew of Carl's drug, picking over all details in the hope she might find something that would help her and the baby. The hormone came from the glands of the rare, tiny rodent called the botinga, which was found only in certain areas of the Amazon basin and which was so delicately adjusted to its environment that it could not live in captivity. The botinga were tiny, but the chemical, purified and altered, caused enormous cellular multiplication. It also brought increased strength to the bones, muscles, and tissues, so that Rufus, for instance, whose bones would hardly have held his present weight if they were of average strength, functioned as a perfectly normal guinea pig—ten times enlarged.

Was there any way of stopping or reversing the process? She had never heard Carl mention any. It was a one-way street.

In a few days, Andy had outgrown his cot, and had to sleep in her bed. He was voracious. The canned milk was nearly gone, but he seemed able to eat almost anything. She fed him fish—piranha, pacu, catfish—

which she caught by throwing crushed tembo roots on the water of a pool and waiting for the stupefied, paralyzed fish to float to the surface. She fed him fruit and smoked meat and managed to shoot two small, turkey-like jacus. It seemed to her that she fed him all day and all night and he ate, grew, ate, and grew some more.

On the sixth day she watched the river but Tukaja did not come. She thought of calling Carlos M o r e n o s—but what good would it do? The people were distrustful of her and her husband. If they knew of the monstrous baby they might kill him. They might kill her for being a witch. They might do anything.

She asked herself whether it might not be better if they did kill Andy, and was immediately ashamed of the thought.

She could only wait for Carl. At least there was no danger; Andy was only a baby, after all; and he was *her* baby, even if the floors creaked when he toddled. She let him play in the yard, amusing himself by breaking up sticks. On the morning of the eighth day, still alone, she was preparing food when she

heard a gargantuan chortling. Kip-kip!"

That meant that Skipper, their little mongrel dog from Para, had wandered into the clearing. He had returned from one of his long foraging trips in the jungle. Good. Little Andy loved to play with the dog; they were cronies. She heard Skipper whine suddenly, then, after a pause, give his usual double-bark of recognition. Good. Even the dog knew that Andy was still Andy.

She heard his enormous chortles as he had fun with his pal, and she was able to smile. He still knew the same things, liked the same things. He was still Little Andy.

The food was ready. As she neared the back door, a strange odor floated in the air. It was raw, rather acrid, rather cloying odor. She had smelled it before... somewhere somewhere...but she couldn't remember. Vaguely connected with something unpleasant.

It grew strong as she approached the yard. Cloying—unpleasant—how odd!

But nothing was wrong, for she could hear little Andy chuckling and laughing.

HE WAS SITTING on the ground, dabbling his fingers in something. His face was smeared. She glanced around, wondering where the dog was. Then she noticed the tangled, sticky, red mess the baby was dabbling in. In a sudden, sick wave she remembered where she had first smelled that ripe scent. Once as a young girl she had been taken by her father to visit a slaughterhouse.

Quickly she set down the basin of food and leaned sickly over the porch rail. She remembered the words of Carl: *"given strength to implement their whims...menaces...sort of blind tyrant..."*

The words lanced through the coils of nausea and for the first time she realized the fullness of the danger. She had been reacting as though Little Andy were only a baby—her baby—in trouble. But now as she watched Andy with the torn dog, her mother love was combated by self-preservation.

She could not wait for her husband or Tukaja; she must phone Morenos. As she hurried toward the telephone there was a heavy thump on the back porch and a tremendous wail-

ing. He had fallen and hurt himself. She veered between two forces, then walked back to the porch.

"Now, Baby," she crooned. He was screaming with rage. "Now, Baby." He had pulled a bulky shelf down on top of him and lacked coordination to disentangle himself. One huge arm stuck out, blindly grabbing and thrashing.

She kept her distance from the grasping hand and somehow got the shelf off him. Smeared with scarlet, blotched with rage, and streaked with tears, his great face seemed hardly human. He grabbed at her and she bolted for the telephone.

He clumsily got to his feet and followed, bawling with anger. He had learned to walk only a few weeks before, and he was very clumsy. He stumbled and blundered, but he kept coming. Helen reached the phone and began to crank.

"Pone!" boomed Little Andy. He grabbed the telephone, yanked, and it ripped from the wall. He stopped crying, sat on the floor, and began playing with the new toy.

Helen leaned against the wall and tried to think.

The day was hot; she seemed to be smothering. Outside she heard the cries of the cotingas and parakeets, through the window she could see the rich impasto wall of flowers, vines and trees that was the jungle. She was surrounded by aloof, uncaring and urgently living things, isolated with a primitive and very dangerous force. She could not think.

Maybe Tukaja would come today. There was no way of reaching Carl.

SHE SAW that Little Andy's mood had changed. Baby-like, he now was full of sunshine, seven feet of it: His face was like any baby's face, bland as milk and inscrutable as bread. She got a cloth and wiped the blood and sweat off, cooing and crooning to him as he chortled. After all, she chortled. After all, she thought cheerfully, he's only a baby and he loves me. How foolish, to be really afraid of him. Impulsively she put her arms around him.

He hugged her like a rock-crusher.

"Don't Andy," she cried, muffled against him.

Laughing, he pulled her

tighter, pressing her nose and mouth into his soft baby-flesh. She was suffocating. She tried to tell him to stop, but couldn't make a word come. A keening sound grew in her ears and a little silver light danced before her eyes. Andy prattled happily, booming in her ears. "Mum-Mum! Mum-Mum!"

She got her mouth open, worked a fold of flesh between her teeth, and bit hard.

Little Andy screamed like a steam calliope. She felt herself suddenly yanked away from him and she gulped the blessed air. But his immense, chubby hands were still around her and she felt herself lifted and shaken like a bundle of limp spaghetti. Suddenly, he smashed her to the floor. A great pain blasted through her head. *If he does that again, he'll kill me*, she realized dizzily.

He raised her high, and shook her like a bundle of weeds. She knew he was going to do it again.

"Don't," she moaned. "Don't do that to Mother!" But she knew he would.

There was a rattle on the front porch and the bang of the door, and the startled baby

dropped her. She rolled away from him.

In the doorway was Tukaja. He stood looking at her, not seeing the baby, who stood by the wall. "What the matter, Miss Helen?"

Watery sobs shook her as she gestured toward the giant. Squatting like some fantastic idol, Little Andy grinned at him and blew bubbles.

Tukaja stared, wheeled, and dashed into the jungle.

She walked very slowly toward the door and the baby toddled toward her. She made a sudden dash for it and cried out as his grasping fingers brushed her. He caught her dress and held it, pulling her back toward him. She strained forward, hard, and the dress tore, and she was across the porch and into the clearing.

Tukaja was standing among a clump of burity palms, wild-eyed, and poised to run.

"Tukaja—stay here!" she called. He made a move to leap away, glancing into the jungle.

"Tukaja! Carl will be angry! There's nothing here to be afraid of! Stay here!"

"Giant in house," said the Indian.

"Not giant—baby. Big baby, still baby, like big pig Rufus. Come see. Is Tukaja afraid of baby?"

"Helen afraid," said Tukaja, his voice flat with challenge.

SHE KNEW it was true. His very statement made it more true, and for a moment she nearly ran into the jungle like Tukaja had, to leave the house and the thing that was her son far behind her. But she mastered herself.

"Helen not afraid" she said firmly. "Helen love the baby, need Tukaja help get food, help tend animals." She hoped her voice was not shaking. "Is Tukaja more afraid than woman?"

His chin lifted. "Not afraid," he said.

"Then come," she said. She turned her back to him and walked toward the house so he could not see the fear in her face. Halfway to the house she heard his footsteps following.

With Tukaja helping, things became better. For one thing, he eased the food problem. Andy was eating hugely, and Tukaja brought wild pineapples, and wild beans, peccary, paca, and monkey meat, and many fish.

That was good, and it was good to know a male adult was nearby. But Tukaja was unable to fix the telephone, and that was bad. Also bad, it began to develop, was the fact that he had been deeply impressed by Helen's argument that was, after all, only a baby. Tukaja wanted her to spank him.

It came to a head the evening that Carl was expected back. They had tried to get the baby to eat, and although they knew he must be hungry, he had refused. They were already tired by finding and preparing the dishpan full of food, and then were exhausted and exasperated by trying to pamper him, and finally they gave up and cajoled him into bed where he lay and cried. His crying was deafening. They couldn't sleep.

Finally, Tukaja got up from his sleeping spot on the floor. He tapped on Helen's door.

"Spamp baby."

She came out of her room. "No, Tukaja. Spank baby, make baby mad. Him too strong to make mad. No spank baby."

"Him just baby. Spamp baby, make baby good."

"No." She looked at him closely. His eyes looked odd, as

they did when he had been chewing datura leaves. He walked to the door of Andy's room. "Quiet!" he yelled. "Baby, quiet!"

The baby cried louder.

"Maybe his diaper needs changing," she said matter-of-factly. She found a bed sheet and entered Andy's room. His crying became ear-splitting.

"Tell baby quiet," said Tukaja. "Spamp 'im."

She looked in dismay. His face was red and wet and his arms were waving. He was in no mood to stop crying, and she was afraid to even come near him.

"Quiet!" yelled Tukaja. She jumped. He was standing right behind her, looking over her shoulder.

Andy cried louder. He picked up a soft pineapple and threw it into Tukaja's face. Tukaja grunted wildly and lunged past her into the room. "Spamp bad baby!" He picked up a palm leaf broom and began to thwack blows on Andy's seat.

"Stop!" Helen choked. "You don't know what you're doing!"

ANDY STUMBLED forward, arms swinging, and

a flopping arm knocked Tukaja down. Before he could get up the baby had both hands on him.

"Let go!" he yelled, "Helen mam, help Tukaja!"

She tugged at the great fat arms, ineffectual as a monkey trying to move an elephant. Andy was shaking the Indian just as he had shaken Helen, and Tukaja was shouting things in the Bororo language. Suddenly Andy threw him against the wall and he stopped shouting.

Helen stood helpless. A rather terrible time began for her.

The baby wanted to play with the body, and she couldn't get it away from him. Coaxing was no good. She daren't try force. When she tried to lure him away, he carried it with him, like a doll, tucked under his plump arm.

She sat and watched him play with it and wondered if the scene was real. He took the head in one hand, the feet in another, began pulling.

Then he wanted to play roll-the-ball, but his mother wouldn't cooperate.

Helen had been watching with an unreal, fearful, irresis-

tible hypnosis, but she finally made herself look away, and then she went to the kitchen. She had given up thinking; she just wanted not to think not to know, not to wonder.

After a long while, she looked into the front room. He was prattling to himself, gazing out the window, his fingers dabbling idly in the horror on the floor. One of the small, stingless bees of the Amazon crawled lazily on his face. "It's too much," Helen whispered. "Just too much." Swiftly and quietly, forcing herself onward, she darted into the front room, gathered up what she could, and dashed back into the kitchen. Behind her rose the calliope howl of a baby deprived of its toy.

SHE GLANCED around frantically, and saw the huge, gasoline-driven refrigerator Carl had brought for both food and the compounds he had to keep refrigerated. She heard the footsteps thudding behind her. She thrust her burden behind the refrigerator and darted to one side.

A stinging blow knocked her sprawling. She got to her hands and knees just as Andy, grab-

bing for his plaything, knocked the big refrigerator over. It crashed on the back of her head, there was another shock as her forehead struck the linoleum, and a rich gravy of darkness engulfed her...

Late into the tropic night Little Andy played with his toy. He sat in the front room, beside the door. Outside, the night-birds sounded; and sometimes the gonging, primal cry of a howler monkey rang like a dark triumph, and an amusing sound came from the kitchen. It was the sound of Helen breathing, still unconscious beneath the refrigerator.

Little Andy's toy had begun to bore him; he couldn't get it back together.

He was about to open his mouth in a wail of ennui and protest when he heard a sound by the river. There was a familiar whistle on the porch.

Andy broke into the grin of any delighted baby. Close to the door and out of sight, he dropped the broken doll and raised his arms to give embraces. Fun was coming through the doorway.

"Da-da!" prattled Little Andy. "Da-da!"

Readin' and Writhin'

Book Reviews by CALVIN M. KNOX

FIRE IN THE HEAVENS,
by George O. Smith. Avalon
Books, \$2.75.

Here is an agreeable and relaxing lightweight novel whose plot revolves around the impending explosion of the sun—and if you didn't think it was possible to write a bland and breezy novel on such a theme, invest a few dollars in this new Avalon entry and discover how it's done.

Smith has set this novel (which appeared first in *Starling Stories* for July 1949) in a never-never fantasy world which masquerades as Earth of

the middle twentieth century, but which is peopled by lovely young female industrial tycoons, goodhearted bachelor engineers, and scheming, crafty, villainous financiers. It's a world in which space-ships are constructed by private industry, and in which not a hint of international strife exists. George O.'s lovely young tycoon sets the key in this passage from Chapter Two:

"The nation that controls the moon and space travel controls the destiny of humanity, Doctor Phelps."

"Yes, I see."

"And once I prove that my system works, I can sell or lease the principle to the government for a very great deal of money."

This sort of stuff might have been acceptable in the remote and innocent days of 1949; in today's world of space satellites, ICBMs, and forty-billion-dollar defense budgets, it's entirely inconceivable that anyone could privately set about to develop space travel. So, in brief, the socio-cultural matrix in which "*Fire In the Heavens*" is set is pure whipped cream.

The science in the book is a bit tarnished by time, too, since a good bit of Smith's ingenious speculative notion about the law of conservation of energy depends on the non-existence of the neutrino—and the neutrino, unfortunately, was proven to exist several years ago. But—as might be expected in a book by this author—the underlying scientific speculation stands up a lot more solidly than either characterization or writing. The action moves smoothly along; the pace is

swift; and the engineering-laboratory background is accurate and convincing. If you can swallow the fact that the characters and background of this novel are about as plausible as lemon-colored dollar bills, and if you don't mind Smith's rover-boy type of narrative technique, it won't be hard to derive entertainment from "*Fire In The Heavens*." But it seems a better bet for science-minded youngsters than for adult readers.

SLAVES OF THE KLAU, by Jack Vance. Bound with **BIG PLANET**, by Jack Vance. Ace Books, 35¢.

This latest Ace Double is a real bargain—a double helping of Jack Vance's vivid and adventurous storytelling. *Slaves of the Klau*, the shorter of the two novels, has been justifiedly rescued from neglect; this is its first publication since its 1952 appearance in the short-lived pulp, *Space Stories*, where it was called "Planet of the Damned." It tells of Earthman Roy Barch, carried off to a slave-planet by alien invaders—but the story is much

deeper than the bare skeleton suggests.

Vance's world of Magarak (a coal-mining world; Vance's alien names frequently are so chosen) is brilliantly realized; characterization, both of Barch and of non-human heroine Komeitk Lelianr, is far more than minimal; and, as in any Vance story, the setting and minor characters pulsate with life. (This is, by the way, the only s-f novel I can think of in which the hero *fails* to prevent the rape of the heroine!)

Vance, in all his novels, provides the essential value of science fiction: he gives us new images, shows us things we cannot see for ourselves, paints us worlds we will never visit. *Slaves of the Klau* is an unforgettable adventure yarn.

On the reverse side of this Ace item is his *Big Planet*, published last year in hard covers by Avalon. The Avalon edition, unfortunately, is somewhat expurgated and, in addition, is freighted by silly and superfluous chapter headings; but the original version (in *Startling Stories* for September 1952) is not easy to obtain,

and the vigor and imaginative power of this odyssey-style novel are not obscured in this edition.

Both ends of this book tingle with excitement. Very highly recommended.

UNDERSEA CITY, by Frederik Pohl and Jack Williamson. Gnome Press, \$2.75.

The third in a series of Pohl-Williamson teenage books that began with "*Undersea Quest*" and "*Undersea Fleet*"—and it's a disappointingly thin novel, by the normal standards of teenage science fiction (where the yardstick must be the novels of Robert Heinlein).

Pohl and Williamson make the most of their undersea background; the life of a cadet in the Sub-Sea Academy is sketched sharply, the details of the undersea cities are refreshingly well handled. But there is more to a good teenage novel than the background development, and *Undersea City* fails to provide much more than that.

The authors have concocted their story out of stale formula

situations and stock teenage-novel characters: the smug and arrogant millionaire's-son cadet who learns the error of his ways; the sinister Oriental lurking in the backdrop; the beloved and heroic uncle of the narrator who is suspected of committing a hideous crime, and so on. These standard pieces of furniture could be forgiven if only the protagonist were vividly portrayed—but, alas, first-person narrator Cadet Jim Eden is a vague and undefined person, only tangentially involved in most of the action and completely undifferentiated as a character.

The action moves along swiftly, and the element on which the plot turns is ingenious and scientifically valid. It's too bad that the book is so pallid. It's neatly constructed and well written (though its authors are overly fond of the one-line paragraph) but all its tidy plotting fails to make it the equal of one of Heinlein's formless, rambling, utterly fascinating teenage books. This one isn't even up to the (fairly high) standard of its two predecessors. Perhaps the vein has been worked too deeply.

SATELLITES, ROCKETS, AND OUTER SPACE, by Willy Ley. Signet Key Books, 35¢.

A brief (128 pages) and admirably lucid run-down of information on the new world of "outer" space that has opened to the public since October, 1957. This slim Signet item is obviously slanted for the man-in-the-street sort who wants to know what the shouting's all about; just as obviously, it was hastily compiled to meet somebody's frantic deadline.

The haste shows not in the factual material, which is—as one confidently expects from Willy Ley—impeccable, but in the organization, which is a trifle on the helter-skelter side. Ley travels hither, thither, and yon over the various problems and aspects of space flight, seemingly choosing his order of discussion at random. But what he has to say is clearly put forth—if you don't object to hunting around in an indexless book, which is divided into five large sections and subdivided into some forty-odd briefer segments.

There's plenty of good sense

here, especially when Willy discusses flying saucers (though the relevance of the saucer section to the rest of the material seems open to question.) The book is a readable compendium of miscellaneous essays on space flight. But it doesn't in any way supplant Ley's definitive work on the subject, the massive and exhaustive "*Rockets, Missiles, and Space Travel*," which appeared in a revised-and-expanded edition during 1957, and which will undoubtedly undergo yet another overhauling shortly to take in the spectacular space achievements of the sputnik era.

EARTHMAN COME HOME, by James Blish. Avon, 35¢.

Avon has released an abridged reprint edition of this 1955 Blish novel, which is discussed at length by Damon Knight in *Science Fiction Stories* for July, 1955.

In case you don't have Knight's review available, let it briefly be said that this novel is assembled from the four Blish "Okie" stories, three of them from *Astounding* and one

(the longest) from the defunct *Two Complete Science-Adventure Books* magazine. The novel deals with the space-borne city of New York many centuries in the future; despite its flaws, which are mainly repetitiousness and a certain opacity of texture in spots, the book is a vivid and impressive portrait of a fascinating future variant, made notable by Blish's usual scientific punctiliousness, and by some sharp character insight.

I haven't made a chapter-by-chapter comparison, but the abridgement appears to reduce the book's original length of 80,000-plus words by about an eighth. No excessive violence seems to have been done, since the original was definitely on the topheavy side; and the removal of 10,000 words does thin the mixture enough to accelerate the pace quite a bit. It's too bad that no paperback publisher cared to present this novel in its original form, but the abridged version is recommended to those unable to obtain the complete book. This will probably be basic-library stuff for science fiction fans of the next few years.

ANACK

by Richard Hardwick

There was no danger in playing with the past unless you cut into your own personal timeline. But Purdue insisted that he live part of his own life again, with the extra equipment that Anack provided...

PURDUE felt utterly foolish as he finished dialing the number and was just about to hang up when someone lifted the receiver on the other end.

"Anack," came the crisp voice over the wire.

Purdue had actually thought the letter an elaborate joke and he was a little shaken when the telephone number answered.

"Anachronisms, Incorporated," the voice said, giving the full name as it had appeared on the letter.

"I'd—I'd like to make an appointment, I received a letter..."

"Your name and notification number, please," the voice interrupted, very business-like.

Purdue fumbled through the papers on his desk. He recalled having seen a number on the letter. He found the letter in the stack.

"Purdue. Jon Purdue. 237714 A," he said, feeling foolish again as he did so.

Without pause, the voice said: "Will three o'clock this afternoon suit you, Mr. Purdue?"

"Why—yes. That will be

fine." Purdue said, and almost hung up. "Wait! Where—where do I go?"

"Our Mr. Treadway will call on you," the voice said, and the phone clicked off and began to buzz.

AT PRECISELY three o'clock, Jon Purdue's secretary buzzed him. "A Mr. Treadway to see you, sir. He says he has a three o'clock appointment. I don't have it in my book..."

"That's all right, Miss Crane. Send him in."

The door opened and a small, swarthy man entered. He was a foot and a half shorter than Purdue, who himself stood just five foot six in his stocking feet.

"Well, well," said the little man cheerily. "How do you do, Mr. Purdue?" He stuck out a small, pudgy hand, "I'm Treadway, with Anachronisms, Inc."

They shook hands, Purdue at a loss for words.

Treadway smiled. "May I sit down?"

"Oh!—by all means! By all means!" Purdue said quickly, proffering the chair at the side of the desk.

Treadway seated himself, or rather, climbed into the chair, his head barely visible over the edge of the desk. He lifted his briefcase to the desk and almost immediately stood up in the chair. "If you don't mind. My size does have its disadvantages."

PURDUE mumbled, "Certainly." He watched, fascinated, as Treadway unzipped the briefcase and drew forth a slick folder.

"I don't know whether you had anything particular in mind, Mr. Purdue, but let me show you some of currently popular anacks. We get this brochure..."

"I beg your pardon, you said..." Purdue interrupted.

"Sorry," Treadway laughed. "Anacks. That's what we call anachronisms in the trade. As I was saying, we get this brochure up every six months, based on a poll among our clients."

"You mean this has been going on for—for..." Purdue wasn't certain what he wanted to ask.

"Years, Mr. Purdue. *Years.*"

Treadway opened the brochure and turned it obliquely on the desk so that they both could see the pages. "Here is one of our most popular anacks. I don't really know why. Personally, I don't like it, but, ha, ha, that's what makes chariot racing."

"I beg your pardon?"

"Just a trade joke," said Treadway.

Purdue looked at the brochure. It was in full color, somewhat on the lay-out of *Life* magazine. The principal picture centered on a great dusty plain. Thousands of troops were on the march. Hundreds of horses, wagons, and chariots. In the distance was a large body of water along the edge of which were drawn a great many boats. They had the appearance of being very ancient. Purdue cocked his head as he noticed something else. What seemed to be a jet aircraft was streaking across the plain just about the troops, rockets belching from beneath its wings and the red streak of tracers plowing into the fleeing masses.

"Very popular, particularly

among men who didn't see service in the last war. Were you in service, Mr. Purdue?" Treadway asked conversationally.

JON PURDUE nodded as he stared at the picture, "First war," he mumbled. He could almost feel the thrill of swooping down on the helpless foot soldiers; could imagine their terror at this silver bird spouting wholesale death and destruction.

"Perhaps you'd like a sample, Mr. Purdue. One or two passes to sort of get the feel of it?" Treadway suggested.

"Do you mean I could actually—but I don't know how to fly..."

"Certainly you do! You've just never had the opportunity. However, perhaps something else," Treadway slowly turned the page. "One of my own favorites here."

"Forgive me, Mr. Treadway, but might I see that first page again?" Purdue said hesitantly.

"Why, most certainly!" Treadway said as he reversed the page with a flourish. "This is, of course, the Trojan War.

A little later they bring on that abominable horse. Say, maybe you'd like to clobber the horse? Or perhaps a little hand-to-hand combat with Achilles? Naturally, A. I. would supply you with a tommy-gun."

"Did you say I could—could have a *sample*?"

"Absolutely! I don't mind telling you that you came to our attention very highly recommended. We are hopeful of you becoming one of our best customers."

PURDUE frowned. "I was recommended? By whom?"

Treadway smiled and wagged his finger. "No names. A. I. holds all communication in strictest confidence. Sorry."

"Of course," Purdue said. But he wondered who in his acquaintance participated in this service that was being offered him. "How do I go about this, uh, sampling?"

"What would you like to try?" Treadway rubbed his hands together. "Want to take a crack at the Trojan War, for a starter?"

Purdue nodded, his throat suddenly terribly dry.

"Please instruct your secretary that you do not wish to be interrupted under any circumstance."

He gave Miss Crane the instructions and turned to face Treadway.

The next thing Jon Purdue knew, he was flashing down the sky in a jet aircraft, and, somehow, he was a crack pilot. He expertly threw the ship into a steep turn. Far below he saw the plain. A mile or two away was the sea. The Myrmidon fleet was drawn up along the beach, the high sterns of the vessels in the sand. Purdue gritted his teeth and put the ship into a screaming dive. The earth and sea flew to meet him. He cut loose with the rockets, then, closer, he squeezed off a burst with the machine guns. Two of the vessels exploded as the rockets struck; terrified faces turned up toward the demon in the skies. He even saw a pitiful arrow or two arch upward as he streaked past...

PURDUE was gritting his teeth and had an iron grip on the tall fountain pen in the

desk stand. He was pressing with his thumb against the top of it and saying, *rat-tat-tat tat*. The last *tat-tat* trailed off foolishly as he looked across the desk at his small visitor.

"Well?" Treadway said. "What'd you think of it?"

"What...how...?" Purdue stammered.

"Thrilling, wasn't it? Tell me, did you clobber that lousy horse?"

"No, but I really tore into a bunch of ships along the beach!" Purdue said proudly.

"Oh, *good* for you! The Myrmidon fleet!" Treadway clapped his hands excitedly. "I'd love to have seen it!"

Purdue leaned forward on the desk. "Was I—I *really* there? What is this business, some sort of hypnosis?"

Treadway shook his head sadly. "They *all* think it's some trick. But it isn't. History is changed, and a new time-line starts. The subject is returned to this time-line, where it never really happened, of course—except for instances where the subject is connected with his own past. Then there's a carry-over; that has been proven to

some who are unfortunately no longer with us."

"What do you mean? Is there some danger? Could those men have—have *shot* me *down* just now?" Purdue said quickly.

"No, not that far back. The danger lies in going back and re-doing something in your own lifetime. Then there is a definite, though remote, danger. I should heartily recommend that you make all your anacks before 1900. That *was* the year of your birth, wasn't it?"

PURDUE nodded, then said, "What's the danger of going back in your own lifetime?"

"Self-destruction, Mr. Purdue. Self-destruction," Treadway said gravely.

"*Suicide?*"

"Of a sort, I suppose," Treadway nodded. "Many people, it seems, have a subconscious desire to be dead. An anack can bring it about in a painless manner, but nevertheless, the individual *is* dead."

Purdue looked more puzzled than ever.

Treadway continued. "And there are accidents resulting

from something you might change about your past. You might inadvertently remove something that, unbeknownst to you, stood at one time between you and death."

PURDUE'S gaze was serious.

"I was in the trenches in '17 and '18. I was just a kid but I spent six months in the front lines. The German trenches were less than fifty yards from ours. We even talked back and forth. I remember one German, they called him Fritz. He spoke English and the things he said across to us almost drove me out of my mind. He shook my faith in everything I thought our fighting stood for. I wanted more than anything in the world to kill that man."

He leaned forward toward Treadway. "Would there be a great deal of danger in my going back? I'd like to take that jet."

"I've told you the danger. The decision is up to you." Treadway turned the page of the brochure. "This is a favorite of mine. I hope I won't offend you, but I was very pro-British during the American

Revolution." He indicated a picture—a panorama, actually—of Washington's crossing of the Delaware. There among the ice-floes of the river, almost indistinguishable, was a periscope.

"It's really not as easy as it would seem," Treadway said. "You try firing a torpedo and the ice explodes it before it reaches the boat. What you have to do is surface and blast them with the deck gun. Very exciting, though, particularly the expressions on their faces when the sub pops up from the river!"

"I can imagine," Purdue said, but he was thinking of the German, Fritz, and the heavily-accented English words flowing endlessly across Norman's Land. He had seen the man once, when they had a truce to go out and pick up the dead and wounded after a charge. He had wanted to shoot him then.

TREADWAY turned another page. There was a picture of a cool terrace with a blue bathing pool and palms and exotic flowers all about. Fifteen or twenty scantily-attired girls

lollled about. "Funny thing about this one. It's not so popular as you might think. Most men think they'd like that, but at the last moment, they change their minds. The girls are beautiful, aren't they?" Treadway said. Then he added, with a slightly lecherous smile on his face, "Talented, too!"

Purdue was a little taken aback, having not thought of the little man as anything more than an agent.

"Maybe some other time?" Treadway suggested, seeing that Purdue was not interested.

"Perhaps," Purdue said. He looked intently across the desk. "I want to take that jet and go back to the trenches of the first war. 1917, to be exact."

Treadway heaved a deep sigh. "I was afraid of that. But, if that's what you want, then that's what it shall be. Won't you reconsider? Bombing the pyramids while they're being built is great fun. Makes Cheops spitting mad!" Treadway laughed, trying to get Purdue into the spirit of the prank.

"I'm sure it must be. Perhaps another time," Purdue said.

Treadway shrugged. "Very well. But in the case of lifetime anacks, we have to receive payment in advance. I'm sure you understand."

THAT WAS the first mention of payment. "How much is it?" Purdue asked.

"Two thousand dollars. That's another advantage in taking the old anacks; they're much more reasonable. Two to five hundred dollars, on the average. Won't you reconsider?"

Purdue had his checkbook before him. He shook his head. "To whom do I make this payable?"

"Sorry, no checks, Mr. Purdue. Oh, not that your credit isn't good with us; don't misunderstand! We're prepared to offer you sixty day open account. But, you see, if anything were to happen to you, a check would not be honored." Treadway smiled apologetically.

"Very well," Purdue said, and went to the wall safe. He returned to the desk and handed Treadway a thin sheaf of bills. "It'll be worth it!"

"I hope so, Mr. Purdue. I *hope* so!"

THE JET cut through the blue sky over France like a shaft of silver light. Off to his right Purdue saw a Spad and a Fokker D-7 engaged in mortal combat. Funny, he thought, how it reminded him of the movie, *Wings*, rather than the actual days in the war. He wondered, too, if the pilots saw him, and if so, what their thoughts were. It occurred to Purdue that these anacks might be the foundation of some of the so-called flying saucer scares.

He streaked on toward the front with the inner certainty of a homing pigeon. The terrain seemed odd from the air. Not that Purdue was unfamiliar with flying. He seemed to know all there was to know about it. The tons of steel and aluminum that made up the gleaming jet felt as though they were a part of him. For the sheer joy of it—like a puppy frolicking—he slow-rolled the ship for five miles.

He came to the front. As he swooped low he could briefly see the faces below flick upward. A thrill ran through him and he shoved the throttle and

pulled back on the stick. The jet shot skyward in a breathtaking vertical climb, until it was a silver dot against the vaulted blue.

He came down in a spiralling descent, and, suddenly, there he was! Directly over his own trench! Purdue could almost feel the mud and muck; almost smell the foul and fetid odors; almost hear the taunting voice of the German across the scarred strip of earth.

HIE BANKED and looked down, hoping to get a glimpse of himself, but he was gone before he could be certain. He made his turn and came over again, low, and over the enemy lines. There were the trenches ahead! He could see the deep, angular German helmets bobbing furiously as they tried to flee, and the rockets and tracers snaking and smoking in after them. Earth showered skyward as he pulled up, made his turn, and came back from the other direction. Off to the side, as he swept in, he could see the Americans jumping and dancing in their trenches and waving their arms in

hysterical happiness. He gritted his teeth and cut loose the remaining rockets and splashed hundreds of fifty calibre slugs in after them. He dropped the napalm last and left behind him a flaming earth.

Looking down now, the German positions were only scarred earth. He could see himself and the others—Mac and Sturdivant and Steinberg—he could see them running deliriously about No-man's Land, hugging each other and throwing their helmets into the air. He knew Fritz was dead down there.

PURDUE relaxed and orbited high over the scene. He was high over the trenches when he saw the first explosion. The men scattered and dove for the trenches. Some never made it. The explosions came rapidly. Purdue could not count them they came in such rapid succession. Then, incredibly, he understood what was happening. With their own front line troops wiped out, the German artillery was opening a terrific barrage to keep the Americans from advancing!

"I've got to stop them!" Purdue screamed aloud. He threw the jet into a steep bank, and peeled off toward the distant puffs of smoke from the artillery. The jet screamed like a tortured ghost as it hurtled earthward.

MISS CRANE looked at the wall clock in the outer office. It was almost five.

Suddenly she leaned toward the intercom and flipped the switch. "Mr. Purdue?"

There was no answer. Only the sound of the typists across the office. Miss Crane got up and went to the closed door. For a moment she hesitated, then she lifted her hand and knocked firmly. No answer.

There was no other exit from the office and she was certain no one had come out; she had been at her own desk the entire time.

With a puzzled look she slowly opened the door. Mr. Purdue was there. He was on the ceiling, under the desk, in all four corners of the room, a puddle on the floor.

But his three o'clock appointment was gone.

DOWN TO EARTH

The Things YOU Tell Us

FOR READER SPEISER

Dear Bob:

In the April issue of *Future*, Mr. Jeffrey M. Speiser, in commenting on the first of my "Race Into Space" articles, suggests that the development of the *basic* rocket equation should have included relativistic corrections.

I'll have to disagree on that one unless we're talking about rockets capable of achieving...say...a quarter the speed of light. Naturally, a rocket undergoes the usual Fitzgerald-Lorentz contraction along its dimension of motion, proportional to the square root of 1-velocity squared over the speed of light

squared, with a proportionate increase of mass. The result is, as the rocket goes faster, that the dimension in the direction of motion approaches zero asymptotically while the mass approaches infinity asymptotically. Of course, these changes are exponential and at speeds likely to be attainable in this century, essentially negligible.

As for applying relativistic corrections to the reaction mass, it depends entirely on where you're standing. I don't think we have to worry too much about the apparent paradoxes of the general theory, except in science fiction. By the time we can travel at the speed of light, we'll have an entirely new theory to worry about. The astronomers are already nibbling away at the several general theories of relativity accepted today.

THOMAS N. SCORTIA

ONE FOR ALMA

Dear Mr. Lowndes:

The article "It's Me, Oh Lord" by Alma Hill in the April issue was especially amusing to one who has watched his native tongue change under his eyes (ears?), first with bafflement and later with resignation. The Predicate Nominative went

under without too much of a struggle, almost unnoticed in a welter of other changes.

Does anyone remember the stilted elegance of language used by Horatio Alger Jr's heroes after the invariable rise to success? Gradually this lifted-pinky English shifted to an easy informality described by the purists as positively sloppy. Forty years ago, the distinction between "aggravate" and "irritate" was carefully explained to us. What good did it do? The "r" in February was also called to our attention, again to no avail, since every arbiter of English—as she is spoke on radio and TV—enunciates it clearly "Feb-u-ary", except for a few proponents of the "R", who call it equally clearly "Febber-wary".

Much attention used to be given to syllabification and its result on pronunciation. It was a losing battle too. "Effective" and "offensive" became "ee-ffective" and "oh-fensive" anyway. To make the whole hodge-podge still more bewildering, where vowels have not received totally unnecessary clarity, they have degenerated to the schwa, the indeterminate vowel. Is English destined to become a language of grunts?

For the benefit of prospective teachers of English, let us consider the preposition. It

can't be used to end a sentence with, can it? I like "The Naughty Preposition" by Morris Bishop:

*I lately lost a preposition;
It hid, I thought, beneath
my chair;
And angrily I cried, "Per-
dition!
Up from out of in under
there!"*

*Correctness is my vade
mecum,
And straggling phrases I
abhor,
And yet I wonder, "What
should he come
Up from out of in under
for?"*

Not satisfied with a rapidity of change that is keeping the lexicographers out of breath, we have turned our attention to foreign languages too. Good old German names such as Hormel and Speidel have now acquired an accent on the last syllable, a la francais. But to compensate for this, all French words get the accent on the first syllable, when the less careful French insist on putting it on the last.

All of which merely indicates that the world do move and hardly nothing has went the way it ought to of did.

F. W. ZWICKY,
1602 Fifth Avenue,
Rockford, Illinois

GET OUT YOUR PENCILS

Dear Mr. Lowndes:

Well, what do you know? In the past month or so, you've forwarded three letters from fellow-readers who wanted to know if I've quit reading *Future*, because they haven't seen any of my reports in the letter columns for so long. The fact is, I made my notes for a 13-issue report some time ago—during December—but I just didn't get around to typing them up then.

The "notes" were just a collation of the separate listings I make every time I finish an issue. I type out a list of the stories, then put it away. And when the next issue comes before me—or in a couple of months, whichever is longer—I take that sheet of paper out and rate the stories listed on it, without referring to the issue in question. The reason for this is to allow me to rate stories on the basis of how they seem to me after a cooling-off period. It's an awful temptation to pull the issue out when I'm pondering this way, but the fact that my notes are in one place and my magazines are kept somewhere else keeps me from cheating. But I go home to type out the letter, because then I do like to refer to the

issues in question when I make my comments on the ratings.

I give a "1" to stories that seem excellent to me; "2" to the very good ones; "3" to those I remember as good. These are all on the credit side of the ledger.

A "4" designates stories which I could read, but wouldn't have minded if I never finished, while "5" denotes tales which I thought were just bad. Some I never bothered to finish at the time, and perhaps just skimmed through to settle my mind as to why. There's no significance in the order in which the stories are listed in each category.

Now if you're going to set them up the way you have in the past, then readers will see three sets of parenthesis before each title. In the first, you'll see my ratings; in the second will be the editor's second-thought ratings; and the third set will be blank for the readers to mark down their own ratings. People have written me to tell how amused they were at times to see all three numerals the same before some stories, while perhaps running 1, 2, 3, or 2, 3, 4, of the reverse on others. Hope I've saved you a little extra work by explaining here. (*Thanks; you have!*
RAWL)

All ready?

(1) (2) () Trial Without Combat (Thomas): The fact that his later stories are better doesn't make this one any less outstanding for me.

(1) (2) () This Thing Called Love (Emshwiller): This author started at the top, and hasn't slipped very far below, very often.

(1) (1) () New Arcadia (de Camp): Here's the de Camp story we've been waiting for; too many of his have been only good.

(1) (2) () Each An Explorer (Asimov): And very pleased I am to find that some hard-cover book editor agreed with me.

(1) (1) () The Day of the Boomer Dukes (Pohl): You don't have him as often as the others do, but you usually get the better ones.

(1) (1) () Heav'n, Heav'n (Russell): An old theme made new by inspired writing.

(1) (1) () The Hills of Home (Coppel): Ditto.

(1) (2) () Worlds Without End (Simak): Same comment as on the Pohl story.

(1) (1) () The Man With Talent (Silverberg): By an author with talent, who coasts along on it more than he works at developing it.

(1) (1) () The Mile (Tara): I'm not sure it's science fiction, but it's good literature anyway.

(1) (1) () Mars Trial (Thomas): One of the outstanding jobs he's done for you since "Trial Without Combat".

(1) (2) () Cloak And Stagger (Dickson): Some readers think I don't appreciate humor, but I appreciated this one.

(1) (1) () The Lonely Stars (Nichols); A Scortia under another name reads just as well.

(1) (2) () A Bird in Hand (Gordon): Going to show that science fiction can have real detective stories.

(1) (2) () Squee (St. Clair): Bitter, but effective.

(1) (2) () Time of the Tinkers (Hensley): Another fine re-visit to an old theme.

(1) (2) () Just Call Me Irish (Wilson): Delightful!

(1) (1) () A Little Intelligence (Randall): If the "1" category had been typed in order of my appreciation, this title would lead it off.

(1) (1) () The Pity of the Wood (Leache): Another new writer starting at the top.

(2) (2) () Decline (Bade): Quiet and effective.

(2) (2) () Iron Man

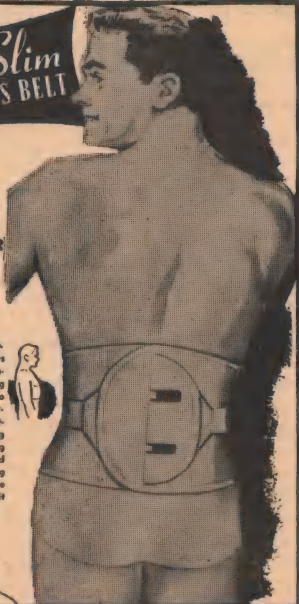
[Turn To Page 120]

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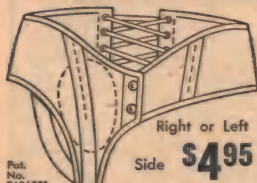
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(Binder): Far above the level of stories for which he used to be so popular.

(2) (2) () **Vulcan's Hammer (Dick)**: Good as it was, I still couldn't forget how overworked the theme is.

(2) (2) () **Code in the Head (Garrett)**: Interesting prequel, but not on a par with the story which follows it.

(2) (3) () **One Man's Inch (Wilson)**: Very amusing.

(2) (2) () **Suite Mentale (Garrell)**: Better than "Code in the Head", but a little short of excellence.

(2) (2) () **One Small Room (Scortia)**: see comment on "Vulcan's Hammer".

(2) (2) () **Yesterday's Heroes (Smith)**: For a change, a surprise ending that has meaning as well as surprise.

(2) (1) () **Bingo and Bongo (Emshwiller)**: Only a certain lack of clarity keeps this from the top.

(2) (3) () **Sinful City (Anvil)**: Uproarious.

(2) (2) () **Nightmare Call (Emshwiller)**: See comment on "Bingo and Bongo".

(2) (1) () **Cat O' Nine Tales (Scortia)**: Ditto.

(2) (1) () **A Season For Remorse (Silverberg)**:

[Turn To Page 122]

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(2) (2) () The Convincer (Gordon): one of the better "psionic machine" tales.

(2) (1) () Starobin (St. Clair): Very good—but I've read too many like it to call it excellent.

(2) (1) () A Gun For Grandfather (Busby): Ingenious. Would be a classic had it appeared in 1930.

(2) (2) () Haunted Centennial (West): Do I perceive some sly digs at a certain industry? Cool, brother!

(2) (1) () Idol's Eye (Emshwiller): It's nearly always a certain vagueness that characterizes this author's stories which are less than her best—just very good.

(2) (3) () The Silver Cube (Hel-

[Turn To Page 124]

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linger): I'm a sucker for this sort of problem story.

(2) (3) () The Night the TV Went Out (G. H. Smith): Generally so effective that I almost forget unconvincing aspects of the background—almost!

(2) (2) () Cargo: Death (Mathieu): A touch of slapdash wasn't apt here.

(2) (2) () The Earthquake Remedy (Mathieu): Better than the above.

(2) (3) () The Song (Chandler): Very nice handling of truly ancient theme.

(2) (3) () The Last Threshold (Wilhelm): Fantasy—but on a high level.

(2) (3) () Fueling Stop (Knox): If stories of future explorers are going to be true to life, then fiascos like the one in this story are entirely legitimate—in real life, it's much worse!

(2) (3) () Boy (Wilson): Unbelievable, but good!

(2) (2) () Tournament, Part One (Hinckley): See comment on "The Silver Cube".

(2) (2) () The Trouble With Toys (Wilhelm): In many ways, far too good for a "2" rating; in other ways, just barely good enough for a "2". So let's compromise.

[Turn To Page 126]

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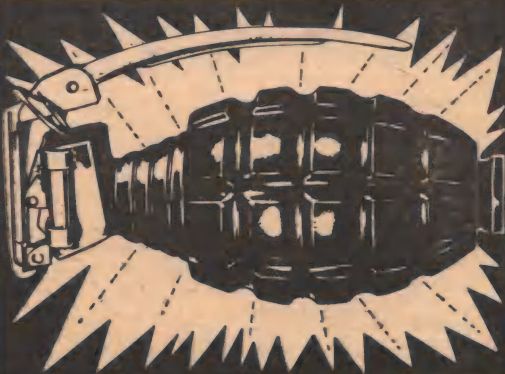
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(3) (3) () Mark of the Homoid (Cox, Jr.): A well-done adventure story is a good thing to see from this author.

(3) (2) () Cornzan, the Mighty (de Camp): Entertaining, but not the sort I expect from this author.

(3) (3) () Labor of Love (West): Slight but good.

(3) (3) () Solitary (Silverberg): Reasonably well accounting for a cover which didn't need a story around it.

(3) (3) () The In-Betweens (Wilson): Interesting, but not convincing.

(3) (3) () Force of Mortality (Silverberg): Also somewhat lacking in conviction.

(3) (3) () The Round Peg (Hahn): Should have been built up more.

(3) (3) () Wheels (Zuroy): I liked it—after all, it's no disgrace to write "3" stories!

(3) (1) () Silly Asses (A simov):

As a pithy lesson, excellent; as a short-short story, uh-uh!

(3) (3) () Problem in Ecology (Berry): Took too long to reach the point.

(3) (3) () The Case For Earth (Russell): Review of previous sermons disguised as science fiction. Yassuh, parson.

(3) (3) () The Zoet Space (Goodale): Amusing.

(3) (3) () The Back of a Hand (Thomas): ditto.

(3) (3) () PCMI (Maneikis): The best from this author, so far.

(3) (3) () Object Lesson (Groener): As a pseudo-article, I'd give it a higher rating, but you listed it as a fiction—so, just good.

(3) (3) () Texas in the Sky (Ems): More could have been done with the basic idea.

(3) (2) () The Variable Constant (Winterbotham): Haven't always liked this author, but this story I did like—even though it was just adventure.

(3) (3) () You do Something to Me (Knox): See comment on "Solitary".

(4) (3) () Impractical Joke (de Camp): the point of the story is belabored,

[Turn Page]

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to say the least.

(4) (3) () Venus Trap (Silverberg): Formula, with a "new twist" that is also formula.

(4) (3) () The Fourth Invasion (Josephs): likewise.

(4) (3) () Made to Order (Long): Even more so.

(4) (3) () ... And A Half-Dozen of the Other (Chandler): It made me laugh—but I don't like to be taken after that many pages. Jokes on the reader should be shorter.

(4) (3) () Last Meeting Place (Scortia): Better written than "Venus Trap", etc., but I have the same objection.

(4) (4) () Just Evie and Me (Smith, Ron): I feel that I should be paid, rather than the author, for reading yet another Adam-and-Eve story in science fiction. Still—it was sort of clever...

[Turn To Page 130]

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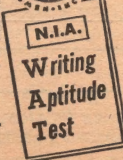
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(4) (3) () Intelligence Quotient (Gordon): Well, he was *trying* to be funny...

(4) (3) () The Last Paradox (Hoch): A clever twist, ruined by hackneyed phrases at the end.

(4) (3) () Frostbite (Wilson): Don't believe it!

(5) (3) () The Professor From Pyjms (Cox, Jr., & Tucker): Two on one soap-box—to the hills, men!

(5) (3) () The Woman You wanted (Silverberg): I agree with the "lone objec-

tor" to this story.

Sorry I couldn't make the comparison between the breakdowns this time and last time—but interested readers will want to do that for themselves, anyway. I refrain from comment on the covers except to say that the humorous ones have been the best; but better still is your new approach. It's lively—but takes the magazine out of the juvenile, "monster", "Buck Rogers", etc, bracket.

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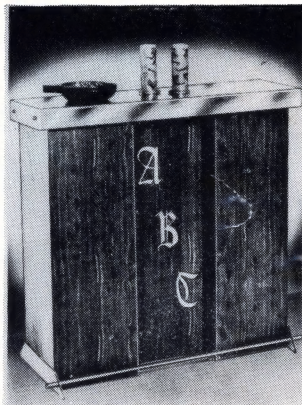
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